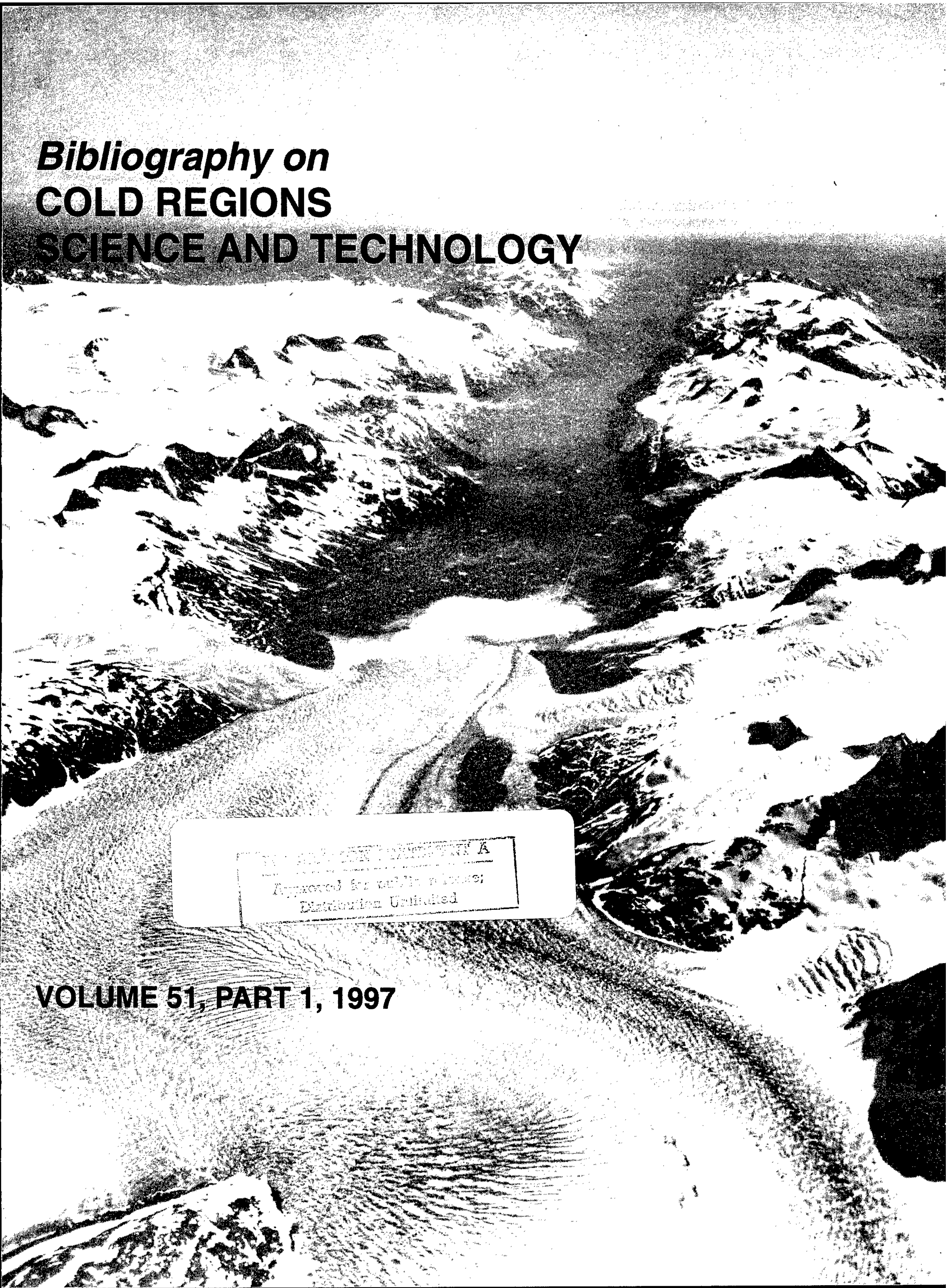

Bibliography on
COLD REGIONS SCIENCE AND TECHNOLOGY

VOLUME 51, PART 1, 1997

December 1997

US Army Corps
of Engineers
Cold Regions Research &
Engineering Laboratory

Bibliography on COLD REGIONS SCIENCE AND TECHNOLOGY

VOLUME 51, PART 1

R.W. Goldblatt, C. Minkus, O.K. Radford, Editors

BIBLIOGRAPHY ON COLD REGIONS SCIENCE AND TECHNOLOGY
Volume 51, Part 1

The *Bibliography on Cold Regions Science and Technology* was first published in 1951 and is a continuing publication of the Cold Regions Bibliography Project (CRBP) in the Science and Technology Division of the Library of Congress. It is sponsored by and prepared for the Cold Regions Research and Engineering Laboratory (formerly Snow, Ice and Permafrost Research Establishment) of the U.S. Army Corps of Engineers. Volumes 1-15 were issued as the *Bibliography on Snow, Ice, and Permafrost,* SIPRE Report 12. Beginning with volume 16 the designation was changed to CRREL Report 12. With Volume 20 the title was changed to *Bibliography on Snow, Ice and Frozen Ground, with Abstracts,* and with volume 23 the current title was adopted.

The present volume contains material accessioned between October 1996 and September 1997. It contains full citations of 5778 items, in many cases with abstracts. Indexing for the volume is issued as Volume 51, Part 2.

This publication is the result of a coordinated effort. The bibliography work was done by the CRBP Staff who entered all data on a single computerized database that accommodates both the *Bibliography on Cold Regions Science and Technology* and the *Antarctic Bibliography,* thus eliminating duplication of effort between the two bibliographies. Citations were entered in the Cuadra STAR system, and camera-ready copy for printing was produced using the FrameMaker composition system.

This publication is available from the National Technical Information Service, Springfield, Virginia 22151. When ordering, the author and subject indexes (Part 2) should also be requested, as the usefulness of the bibliography would be severely limited without them.

For online searching of the entire database—from the early 1950s to the present—visit the CRBP website: *lcweb.loc.gov/rr/scitech/coldregions/welcome.html.* To search monthly accessions to the database, visit the CRREL website: *www.crrel.usace.army.mil/library.*

For information on the CD-ROM version of the database call National Information Services Corporation (410-243-0797).

Roberta W. Goldblatt, Acting Head
Carl Minkus, Acting Head
Olivia K. Radford, Acting Head
Cold Regions Bibliography Project
Science and Technology Division
Library of Congress

51-1

Geological atlas of the Beaufort-Mackenzie area. [Atlas géologique de la région de Beaufort-Mackenzie]

Dixon, J., ed, *Canada. Geological Survey. Miscellaneous report,* 1996, No.59, 173p., Parallel French and English texts. Refs. p.167-173.

Geological surveys, Geophysical surveys, Exploration, Geological maps, Marine geology, Marine deposits, Bottom sediment, Stratigraphy, Tectonics, Petroleum industry, Canada—Northwest Territories—Mackenzie Delta, Canada—Yukon Territory, Beaufort Sea

51-2

Experimental study on water migration in freezing and frozen soils. [Dongtu zhong shuifen qianyi de shiyan yanjiu]

Xu, X.Z., Deng, Y.S., Beijing, Kexue chubanshe (Science Press), 1991, 134p., In Chinese with English table of contents. Refs. p.132-134. Sponsored by the State Natural Sciences Fund Committee (Guojia ziran kexue jijin weiyuanhui).

DLC S594.H75 1991 Orien China

Soil freezing, Frozen ground thermodynamics, Unfrozen water content, Soil water migration, Mathematical models

51-3

Optimized models for establishing forest vegetation on the loess plateau. [Huangtu gaoyuan diqu senlin zhibi jianshe de youhua moxing]

Yuan, J.Z., Zhang, H.X., Quantitative Vegetation Ecology Series (Zhibi shuliang shengtaixue yanjiu xilie zhuanzhu), No.1, Beijing, Kexue chubanshe (Science Press), 1991, 175p., In Chinese with English title page and table of contents. 64 refs.

DLC SD222.L64Y83 Orien China

Loess, Plant ecology, Vegetation patterns, Revegetation, Forestry, Soil conservation, Land reclamation, Regional planning, Statistical analysis, Mathematical models, China

51-4

ERS-1 radarmaps of Germany and the Antarctic Peninsula.

Kosmann, D., Roth, A., Schreier, G., Winter, R., European 'International Space Year' Conference, Munich, Germany, 30 March-4 April 1992: Navigation & mobile communications image processing, GIS & space-assisted mapping. Proceedings, Paris, European Space Agency, 1992, p.321-326, 10 refs.

DLC TL798.N3E97 1992

Spaceborne photography, Imaging, Image processing, Ice sheets, Mapping, Photointerpretation, Antarctica—Antarctic Peninsula

Although ERS-1 was primarily designed to serve the needs for the oceanographic user community, significant interest has been stated in using SAR image data also for land applications. This is especially true in application areas where the specific imaging physics of SAR will unveil new results and in regions of the globe where SAR can bypass the otherwise bad "viewing" conditions of optical imagers. Within the radar map of the Antarctic Peninsula, the ERS-1 data received at the German Antarctic Receiving Station and processed with a real time processor will be used to geocode and mosaic the data. The real-time 100 m pixel browse images allow fast monitoring of polar ocean and glacier phenomena. The applications performed with the antarctic mosaic data are managed within the ERS-1 PISP (Polar Ice Sheet Proposal) project. (Auth. mod.)

51-5

Immunolocalization of antifreeze proteins in winter rye leaves, crown, and roots by tissue printing.

Antikainen, M., Griffith, M., Zhang, J., Hon, W.C., Yang, D.S.C., Pihakaski-Maunsbach, K., *Plant physiology,* Mar. 1996, 110(1), p.845-857, 65 refs.

Plant physiology, Grasses, Plant tissues, Antifreezes, Acclimatization, Chemical analysis, Chemical properties, Temperature effects, Ice crystal growth, Cold weather tests, Stereophotography

51-6

Purification and characterization of a cryoprotective protein (cryoprotectin) from the leaves of cold-acclimated cabbage.

Sieg, F., Schröder, W., Schmitt, J.M., Hincha, D.K., *Plant physiology,* May 1996, 111(1), p.215-221, 27 refs.

Plant physiology, Acclimatization, Cryobiology, Frost resistance, Plant tissues, Chemical properties, Chemical analysis, Temperature effects

51-7

Effects of COR6.6 and COR15am polypeptides encoded by COR (cold-regulated) genes of *Arabidopsis thaliana* on the freeze-induced fusion and leakage of liposomes.

Uemura, M., Gilmour, S.J., Thomashow, M.F., Steponkus, P.L., *Plant physiology,* May 1996, 111(1), p.313-327, 40 refs.

Plant physiology, Grasses, Acclimatization, Cryobiology, Frost resistance, Cold tolerance, Plant tissues, Chemical properties, Chemical analysis, Freeze thaw cycles, Freezing points, Cold weather tests

51-8

Dating of thaw depths in permafrost terrain by the palaeomagnetic method: experimental acquisition of a freezing remanent magnetization.

Løvlie, R., Putkonen, J., *Geophysical research international,* June 1996, 125(6), p.850-856, 12 refs.

Permafrost dating, Permafrost depth, Permafrost physics, Geocryology, Patterned ground, Thaw depth, Remanent magnetism, Rock magnetism, Orientation, Freeze thaw cycles, Sampling, Geomagnetism

51-9

Dislocation/grain boundary interactions in ice crystals under creep conditions.

Baker, I., Liu, F., Jia, K., Hu, X., Dudley, M., *Materials science forum,* 1996, Vol.207-209(pt.2), International Conference on Intergranular and Interphase Boundaries in Materials, 7th, Lisboa, Portugal, June 26-29, 1995. Proceedings, p.581-584, 11 refs.

Ice physics, Ice mechanics, X ray analysis, X ray diffraction, Ice crystal structure, Molecular structure, Ice deformation, Topographic features, Defects, Sliding

51-10

Wetland bryophytes of the Pirttimysvuoma area, northernmost Sweden. [Pirttimysvuomaområdets våtmarksmossor]

Sjörs, H., Marklund, E., *Svensk botanisk tidskrift,* 1996, 90(2), p.87-97, In Swedish with English summary. 19 refs.

Plants (botany), Vegetation patterns, Wetlands, Frost mounds, Tundra terrain, Tundra vegetation, Mosses, Lichens, Sampling, Classifications, Sweden—Pirttimysvuoma

51-11

Some thoughts on the classification of avalanches. [Quelques réflexions autour d'une classification des avalanches]

Ancey, C., Charlier, C., *Revue de géographie alpine,* 1996, 84(1), p.9-21,82, In French with English summary. 15 refs.

Avalanches, Avalanche mechanics, Avalanche tracks, Turbulent flow, Classifications

51-12

Comparison between spatial winter indices and expenditure on winter road maintenance in Scotland.

Cornford, D., Thornes, J.E., *International journal of climatology,* Mar. 1996, 16(3), p.339-357, 48 refs.

Winter maintenance, Road maintenance, Salting, Frost, Snowfall, Cost analysis, Meteorological data, Statistical analysis, Mapping, Correlation, Forecasting, Indexes (ratios), United Kingdom—Scotland

51-13

Review of cloud modeling in weather modification.

Orville, H.D., *American Meteorological Society. Bulletin,* July 1996, 77(7), p.1535-1555, Refs. p.1551-1555.

Precipitation (meteorology), Clouds (meteorology), Weather modification, Cloud seeding, Phase transformations, Ice crystal growth, Silver iodide, Heterogeneous nucleation, Ice water interface, Hygroscopic nuclei, Mathematical models, Simulation

51-14

Molecular dynamics studies of self-interstitials in ice Ih.

Itoh, H., Kawamura, K., Hondoh, T., Mae, S., *Journal of chemical physics,* Aug. 8, 1996, 105(6), p.2408-2413, 23 refs.

Ice physics, Ice crystal structure, Molecular structure, Defects, Latticed structures, Molecular energy levels, Migration, Vibration, Spectra, Mathematical models, Simulation

51-15

Water vapor feedback and the ice age snowline record.

Sun, D.Z., Lindzen, R.S., *Annales geophysicae,* Feb.-Mar. 1993, 11(2-3), p.204-215, 40 refs.

Paleoclimatology, Atmospheric density, Atmospheric boundary layer, Turbidity, Infrared radiation, Water vapor, Humidity, Surface temperature, Radiant cooling, Cooling rate, Snow line, Static stability, Mathematical models

51-16

Internal wave generation by sea ice moving in stratified water: an analytical and experimental study.

Waters, J.K., Hoboken, NJ, Stevens Institute of Technology, 1995, 95p., University Microfilms order No.DA9536949, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Jan. 1996, 56(7), p.3957.

Ice floes, Ice edge, Ice water interface, Ocean waves, Drift, Ice models, Ice forecasting, Mathematical models

51-17

Estimation of ice-sheet topography and motion using interferometric synthetic aperture radar.

Joughin, I., Seattle, University of Washington, 1995, 182p., University Microfilms order No.DA9537331, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Jan. 1996, 56(7), p.3924.

Ice sheets, Glacier surveys, Glacier flow, Glacier surfaces, Glacier thickness, Topographic surveys, Height finding, Radio echo soundings, Synthetic aperture radar, Spaceborne photography, Greenland

51-18

Inhibition of conifer regeneration by an herbaceous perennial, *Wyethia mollis*, in the eastern Sierra Nevada, California.

Williams, M.P., Seattle, University of Washington, 1995, 132p., University Microfilms order No.DA9537373, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Jan. 1996, 56(7), p.3564.

Snow cover effect, Plant ecology, Plant physiology, Vegetation patterns, Revegetation, Forest ecosystems, United States—California—Sierra Nevada

51-19

Numerical solution of multiple front phase change problems for modeling ice thermal storage systems.

Yu, X.H., Blacksburg, Virginia Polytechnic Institute and State University, 1995, 147p., University Microfilms order No.DA9538618, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Jan. 1996, 56(7), p.3988.

Heat pipes, Heat recovery, Ice thermal properties, Ice solid interface, Freezing front, Phase transformations, Heat transfer, Mathematical models

51-20

In situ sampling thermal probe for studying global ice sheets.

Kelty, J.R., Lincoln, University of Nebraska, 1995, 189p., University Microfilms order No.DA9538621, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Jan. 1996, 56(7), p.3925.

Ice sheets, Glacier ice, Ice sampling, Ice temperature, Firn stratification, Borehole instruments, Probes

51-21

Influence of municipal solid waste and sludge composts on redox potential and related interstitial soil chemistry.

McPherson, M.A., Ithaca, NY, Cornell University, 1995, 207p., University Microfilms order No.DA9538778, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Jan. 1996, 56(7), p.3671.

Waste disposal, Sludges, Snowmelt, Seepage, Leaching, Soil pollution, Soil chemistry

51-22

Hydrology and soil interactions in drained and undrained wetlands in the glaciated northern prairie, North Dakota.

Arndt, J.L., Fargo, North Dakota State University of Agriculture and Applied Science, 1995, 283p., University Microfilms order No.DA9539592, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Jan. 1996, 56(7), p.3649.

Wetlands, Ponds, Drainage, Saline soils, Soil chemistry, Soil microbiology, Hydrogeochemistry, Frozen ground chemistry, Nutrient cycle, United States—North Dakota

51-23

Evidence of Quaternary break-out floods along the middle Indus Valley and in the Peshawar Basin of northern Pakistan.

Cornwell, K.J., Lincoln, University of Nebraska, 1994, 256p., University Microfilms order No.DA9516579, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Aug. 1995, 56(2), p.708.

Glacial lakes, Icebound lakes, Ice dams, Lake bursts, Floods, Glacial geology, Outwash, Lacustrine deposits, Alluvium, Quaternary deposits, Geochronology, Pakistan

51-24

Ice-out, diatom community ecology, and varve formation in Big Watab Lake: phytoplankton response to inter-annual climate variation (Minnesota).

Card, V.M., Minneapolis, University of Minnesota, 1994, 106p., University Microfilms order No.DA9517341, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Aug. 1995, 56(2), p.615.

Lake ice, Ice breakup, Ice cover effect, Plankton, Plant ecology, Nutrient cycle, Phenology, Limnology, Lacustrine deposits, Bottom sediment, Paleoclimatology, United States—Minnesota

51-25

Evaluation of seasonal to decadal scale deuterium and deuterium excess signals, GISP2 ice core, Summit, Greenland, A.D. 1270-1875.

Barlow, L.K., Boulder, University of Colorado, 1994, 306p., University Microfilms order No.DA9518598, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Aug. 1995, 56(2), p.706.

Ice cores, Ice composition, Deuterium oxide ice, Isotope analysis, Climatic changes, Paleoclimatology, Greenland

51-26

Meteorological information content and non-profiling applications of the SSM/T-2.

Conlee, D.T., College Station, Texas A and M University, 1994, 120p., University Microfilms order No.DA9520334, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Aug. 1995, 56(2), p.874.

Atmospheric composition, Atmospheric circulation, Polar atmospheres, Water vapor, Humidity, Moisture detection, Surface temperature, Radiometry, Spaceborne photography

51-27

Morpho-dynamic modeling of rock glaciers: San Juan Mountains, Colorado, United States of America.

Fitzgerald, J.W., College Station, Texas A and M University, 1994, 202p., University Microfilms order No.DA9520357, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Aug. 1995, 56(2), p.718.

Rock glaciers, Glacier formation, Glacier flow, Glacier friction, Sediment transport, Slope processes, Talus, United States—Colorado

51-28

Late Quaternary relative sea-level change and evolution of the Maine inner continental shelf 12-7 ka B.P.

Barnhardt, W.A., Orono, University of Maine, 1994, 207p., University Microfilms order No.DA9520697, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Aug. 1995, 56(2), p.707.

Marine geology, Glacial geology, Glaciation, Isostasy, Sea level, Marine deposits, Alluvium, Bottom sediment, Quaternary deposits, Shoreline modification, Geochronology, United States—Maine

51-29

Numerical simulations of cyclogenesis over the western United States (Great Basin, Purdue Mesoscale Model, vorticity).

Chern, J.D., Lafayette, IN, Purdue University, 1994, 199p., University Microfilms order No.DA9523325, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Aug. 1995, 56(2), p.874.

Snowstorms, Atmospheric disturbances, Atmospheric circulation, Atmospheric physics, Mathematical models, Computerized simulation, United States

51-30

Cosmogenic radionuclides in precipitation (beryllium, chlorine).

Knies, D.L., Lafayette, IN, Purdue University, 1994, 125p., University Microfilms order No.DA9523377, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Aug. 1995, 56(2), p.865.

Atmospheric composition, Precipitation (meteorology), Scavenging, Snow composition, Ice dating, Radioactive isotopes, Isotope analysis, Radioactive age determination, Paleoclimatology

51-31

Aminostratigraphy, geochronology and paleoclimatology of central European loess deposits (Czech Republic, Slovak Republic, Austria, Hungary).

Oches, E.A., Amherst, University of Massachusetts, 1994, 244p., University Microfilms order No.DA9510514, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, May 1995, 55(11), p.4757.

Loess, Soil composition, Soil chemistry, Soil profiles, Soil dating, Stratigraphy, Geochronology, Geothermometry, Paleoclimatology, Czech Republic, Slovakia, Austria, Hungary

51-32

Hydro-climatological model of daily streamflow for the northeast United States.

Fennessey, N.M., Medford, MA, Tufts University, 1994, 269p., University Microfilms order No.DA9510802, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, May 1995, 55(11), p.4983.

Snow hydrology, Snowmelt, Stream flow, Runoff forecasting, Global warming, Statistical analysis, Computerized simulation, United States

51-33

Cold tolerance and flowering in rose clover (*Trifolium hirtum* All.).

Nunes, M.E.S., College Station, Texas A and M University, 1994, 194p., University Microfilms order No.DA9432744, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Jan. 1995, 55(7), p.2477.

Plant ecology, Plant physiology, Cold tolerance, Acclimatization

51-34

Forest harvesting effects on streamflow and flood frequency in the northern lakes states (Minnesota).

Lu, S.Y., Minneapolis, University of Minnesota, 1994, 223p., University Microfilms order No.DA9433078, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Jan. 1995, 55(7), p.2625.

Forestry, Forest land, Vegetation factors, Snow hydrology, Snowmelt, Stream flow, Flood forecasting, United States—Minnesota

51-35

Millimeter wave polarimetric radar remote sensing of ice clouds.

Tang, C.X., University Park, Pennsylvania State University, 1994, 199p., University Microfilms order No.DA9428216, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Dec. 1994, 55(6), p.2334.

Cloud cover, Cloud physics, Ice crystal structure, Ice crystal size, Ice electrical properties, Ice detection, Radar tracking, Backscattering, Radio echo soundings, Radiometry

51-36

Cirrus cloud radiative forcing.

Vogelmann, A.M., University Park, Pennsylvania State University, 1994, 185p., University Microfilms order No.DA9428225, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Dec. 1994, 55(6), p.2251.

Cloud cover, Cloud physics, Heat flux, Radiation balance, Light scattering, Ice crystal optics

51-37

Volcanic aerosol and polar stratospheric clouds in the winter 1992/93 north polar vortex.

Rosen, J.M., Kjome, N.T., Fast, H., Larsen, N., *Geophysical research letters,* Jan. 1, 1994, 21(1), p.61-64, 9 refs.

Polar stratospheric clouds, Atmospheric pressure, Polar regions

51-38

Potential of active microwave sensors in monitoring underground permafrost.

Karam, M.A., LeVine, D.M., *SPIE—The International Society for Optical Engineering. Proceedings,* 1993, Vol.1941, Ground sensing, Orlando, FL, Apr. 14, 1993. Edited by H.N. Nasr, p.230-240, 10 refs.

DLC G70.39.G76 1993

Permafrost surveys, Permafrost indicators, Permafrost depth, Active layer, Thaw depth, Electromagnetic prospecting, Radio echo soundings, Mathematical models

51-39

Spatial and temporal reconstruction of twentieth-century growth trends in a naturally-seeded pine forest (*Pinus ponderosa*).

Biondi, F., Tucson, University of Arizona, 1994, 258p., University Microfilms order No.DA9432850, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Jan. 1995, 55(7), p.2464.

Plant ecology, Vegetation patterns, Revegetation, Forestry, Trees (plants), Growth, Phenology, Snowfall, Snow cover effect, United States—Arizona

51-40

Needle, crown, stem, and root phytomass of *Pinus sylvestris* stands in Russia.

Monserud, R.A., Onuchin, A.A., Tchebakova, N.M., *Forest ecology and management,* Apr. 1996, 82(1-3), p.59-67, 42 refs.

Forest ecosystems, Forest canopy, Plant ecology, Taiga, Biomass, Geochemical cycles, Statistical analysis, Forecasting, Russia—Siberia

51-41

Comment on "Recent changes in the North American arctic boundary layer in winter" by R.S. Bradley.

Walden, V.P., Mahesh, A., Warren, S.G., Bradley, R.S., Keimig, F.T., Diaz, H.F., *Journal of geophysical research,* Mar. 20, 1996, 101(D3), p.7127-7136, 28 refs. Includes reply. For pertinent paper see 51-46.

Climatology, Climatic changes, Polar atmospheres, Atmospheric boundary layer, Surface temperature, Temperature inversions, Sounding, Stratification, Profiles, Seasonal variations, Statistical analysis, Accuracy

51-42

Factors influencing inter-population variation in *Ranunculus acris* seed production in an alpine area of southwestern Norway.

Totland, Ø., Birks, H.J.B., *Ecography,* Sep. 1996, 19(3), p.269-278, 40 refs.

Plant ecology, Alpine landscapes, Vegetation patterns, Growth, Climatic factors, Plant physiology, Altitude, Statistical analysis, Geobotanical interpretation, Norway

51-43

Spatial and environmental components of variation in the distribution patterns of subarctic plant species at Kevo, N Finland—a case study at the meso-scale level.

Heikkinen, R.K., Birks, H.J.B., *Ecography,* Sep. 1996, 19(3), p.341-351, 59 refs.

Plant ecology, Biogeography, Geobotanical interpretation, Vegetation patterns, Subarctic landscapes, Classifications, Statistical analysis, Finland—Kevo

51-44

Preparations for the measurements of gas-hydrate crystal clouds in the outer solar system.

Bérczi, S., *Acta climatologica Universitatis Szegediensis,* 1993, 27(1-4), p.5-16, With Hungarian summary. 6 refs.

Cosmic dust, Extraterrestrial ice, Remote sensing, Hydrates, Cloud physics, Condensation, Light scattering, Ice crystal structure, Ice crystal optics, Refractivity

51-45

Growth and pigment production in two subarctic grass species under four different UV-B irradiation levels.

Gwynn-Jones, D., Johanson, U., *Physiologia plantarum,* Aug. 1996, 97(4), p.701-707, 30 refs.

Plant ecology, Plant physiology, Atmospheric density, Optical properties, Ultraviolet radiation, Grasses, Radiation absorption, Growth, Biomass, Environmental tests, Light effects, Statistical analysis

51-46

Recent changes in the North America arctic boundary layer in winter.

Bradley, R.S., Keimig, F.T., Diaz, H.F., *Journal of geophysical research,* May 20, 1993, 98(D5), p.8851-8858, 26 refs.

Climatology, Climatic changes, Polar atmospheres, Cloud physics, Atmospheric boundary layer, Haze, Ice crystal optics, Surface temperature, Temperature inversions, Sounding

51-47

Hydrodynamic diameter of fish antifreeze molecules by quasi-elastic light scattering.

Wilson, P., DeVries, A.L., *Cryo-letters,* 1994, 15(2), p.127-130, 10 refs.

Antifreezes, Cryobiology, Acclimatization, Low temperature research

Measurements are reported of the hydrodynamic diameter of two classes of fish antifreeze molecule determined by quasi-elastic light scattering, as a function of temperature from 18°C to -2°C. The smallest antifreeze glycopeptide AFGP8 from the antarctic notothenid *Dissostichus mawsoni* was found to decrease in size as the temperature was lowered. The Type 111 antifreeze peptide AbI from the antarctic zoarcid *Austrolycicthys brachycephalus* did not change diameter when cooled. (Auth.)

51-48

Modification of the ozone layer by human activities in polar regions. [La capa de ozono y su modificación por la actividad antropogénica: los huecos en las regiones polares]

Banichevich, A., Fernández, W., *Revista geofisica,* Jan.-June 1994, No.40, p.139-182, In Spanish with English summary. 107 refs.

Ozone, Atmospheric composition, Air pollution, Atmospheric circulation, Human factors

Some characteristics of the absorption spectra of ozone and molecular oxygen, including singular properties of ozone formation and destruction in the atmosphere and other important properties of this triatomic molecule, are discussed. Heterogenic catalytic-chemical and dynamic processes, which are considered to be mainly responsible for the dramatic reduction in the production and regenaration of polar atmospheric ozone, are described. Also described are the geophysical, photophysical and chemical characteristics which, by air mass transport, convert the polar atmosphere into a storehouse of anthropogenic substances. (Auth. mod.)

51-49

Weibull clutter and its suppression.

Sekine, M., International Symposium on Noise and Clutter Rejection in Radars and Imaging Sensors, 2nd, Kyoto, Japan, Nov. 14-16, 1989. Proceedings. Sponsored by the Institute of Electronics, Information and Communication Engineers of Japan (IEICE), Tokyo, Amsterdam, North-Holland Elsevier Science Publishers B.V., 1990, p.6-11, 28 refs.

DLC TK6573.I59 1989

Ice surveys, Sea ice distribution, Ice detection, Radar echoes, Radar tracking, Sea clutter, Image processing

51-50

Observation of the ice floe using an X-band radar.

Hayashi, S., Ide, M., Aota, M., Ishikawa, M., International Symposium on Noise and Clutter Rejection in Radars and Imaging Sensors, 2nd, Kyoto, Japan, Nov. 14-16, 1989. Proceedings. Sponsored by the Institute of Electronics, Information and Communication Engineers of Japan (IEICE), Tokyo, Amsterdam, North-Holland Elsevier Science Publishers B.V., 1990, p.60-65, 2 refs.

DLC TK6573.I59 1989

Ice surveys, Ice floes, Ice surface, Surface roughness, Ice detection, Drift, Radar tracking, Radio echo soundings

51-51

Towards the improved detection of small ice targets in K-distributed sea clutter.

Nohara, T.J., Haykin, S., Currie, B.W., Krasnor, C., International Symposium on Noise and Clutter Rejection in Radars and Imaging Sensors, 2nd, Kyoto, Japan, Nov. 14-16, 1989. Proceedings. Sponsored by the Institute of Electronics, Information and Communication Engineers of Japan (IEICE), Tokyo, Amsterdam, North-Holland Elsevier Science Publishers B.V., 1990, p.66-71, 10 refs.

DLC TK6573.I59 1989

Ice detection, Ice reporting, Ice forecasting, Ice routing, Ice navigation, Radar tracking, Radar echoes, Statistical analysis

51-52

High-speed holographic imaging radar with rotating antenna array and a display technique of low resolution radar images.

Aoki, Y., Mitsuhashi, R., Zheng, P.K., Satoh, T., International Symposium on Noise and Clutter Rejection in Radars and Imaging Sensors, 2nd, Kyoto, Japan, Nov. 14-16, 1989. Proceedings. Sponsored by the Institute of Electronics, Information and Communication Engineers of Japan (IEICE), Tokyo, Amsterdam, North-Holland Elsevier Science Publishers B.V., 1990, p.755-760, 3 refs.

DLC TK6573.I59 1989

Snow cover effect, Subsurface investigations, Radio echo soundings, Radar photography, Holography, Image processing

51-53

Improved snow and glacier monitoring by the Landsat Thematic Mapper.

Rott, H., Markl, G., European coordinated effort for monitoring the Earth's environment: a pilot project campaign on Landsat Thematic Mapper applications (1985-87), Noordwijk, Netherlands, European Space Agency, 1989, p.3-12, ESA SP-1102, 12 refs. Presented at a workshop: Earthnet Pilot Project on Landsat Thematic Mapper Applications, Frascati, Italy, Dec. 1987.

DLC G70.39.E85 1989

Glacier surveys, Glacial hydrology, Meltwater, Snow surveys, Snow hydrology, Snowmelt, Runoff forecasting, Spaceborne photography, Austria

51-54

Multitemporal snow classification with TM data.

Gangkofner, U., European coordinated effort for monitoring the Earth's environment: a pilot project campaign on Landsat Thematic Mapper applications (1985-87), Noordwijk, Netherlands, European Space Agency, 1989, p.13-21, ESA SP-1102, 17 refs. Presented at a workshop: Earthnet Pilot Project on Landsat Thematic Mapper Applications, Frascati, Italy, Dec. 1987.

DLC G70.39.E85 1989

Snow surveys, Snow cover distribution, Snow cover structure, Snow surface, Mapping, Terrain identification, Reflectivity, Radiometry, Spaceborne photography, Austria

51-55

Numerical analysis of the wind-induced circulation in the Bransfield Strait (Antarctica) using ERS-1/WSC winds.

Espino, M., García, M., Puigdefábregas, J., Figa, J., Arcilla, A.S., Workshop on ERS-1 Pilot Projects, 1st, Toledo, Spain, June 22-24, 1994. Proceedings, Paris, European Space Agency, Oct. 1994, p.37-40, ESA SP-365, 6 refs.

DLC QE33.2.A7W67 1994

Oceanographic surveys, Ocean currents, Marine meteorology, Air water interactions, Wind (meteorology), Wind factors, Spaceborne photography, Computerized simulation, Statistical analysis, Antarctica—Bransfield Strait

One of the goals of the Pilot Project "Application of ERS-1 products to Geophysical Research in Antarctica" (PP2-E1) was to assess the characteristic wind-induced circulation patterns in the Bransfield Strait region during austral summer. From a data set corresponding to the period Dec. 1992 to Apr. 1993, 21 synoptic wind fields covering the study area were extracted. A simple method was established to interpolate the wind velocity and direction at error-flagged nodes and to reassess the wind direction where necessary. The directional distribution of the computed WSC (Weddell-Scotia Confluence) wind fields compares reasonably well with the few available local meteo statistics. On the other hand, the WSC winds exhibit a spatial variability which could not be resolved by local observations. Representative WSC wind fields have been selected and used to force a quasi-3D primitive equation finite element circulation model developed at LIM/UPC. (Auth. mod.)

51-56

Operational ice monitoring with ERS-1 SAR.

Herland, E.A., Workshop on ERS-1 Pilot Projects, 1st, Toledo, Spain, June 22-24, 1994. Proceedings, Paris, European Space Agency, Oct. 1994, p.135-138, ESA SP-365, 10 refs.

DLC QE33.2.A7W67 1994

Ice surveys, Sea ice distribution, Ice reporting, Ice navigation, Ice routing, Icebreakers, Ice breaking, Spaceborne photography, Radar tracking, Synthetic aperture radar, Baltic Sea

51-57

Pilot ice monitoring service using ERS-1 SAR images.

Sandven, S., Johannessen, O.M., Pettersson, L.H., Miles, M.W., Drottning, Å., Workshop on ERS-1 Pilot Projects, 1st, Toledo, Spain, June 22-24, 1994. Proceedings, Paris, European Space Agency, Oct. 1994, p.139-142, ESA SP-365, 6 refs.

DLC QE33.2.A7W67 1994

Ice surveys, Sea ice distribution, Ice conditions, Ice reporting, Ice navigation, Ice routing, Spaceborne photography, Radar tracking, Synthetic aperture radar

51-58

ERS-1 ice monitoring of the Northern Sea Route.

Johannessen, O.M., Sandven, S., Pettersson, L.H., Miles, M.W., Kloster, K., Melent'ev, V.V., Workshop on ERS-1 Pilot Projects, 1st, Toledo, Spain, June 22-24, 1994. Proceedings, Paris, European Space Agency, Oct. 1994, p.143-148, ESA SP-365, 5 refs.

DLC QE33.2.A7W67 1994

Ice surveys, Sea ice distribution, Ice conditions, Ice detection, Ice reporting, Ice forecasting, Ice routing, Ice navigation, Spaceborne photography, Radar tracking, Synthetic aperture radar, Northern Sea Route

51-59

Operational sea ice charting using ERS-1 images in the Baltic Sea.

Grönvall, H., Seinä, A., Workshop on ERS-1 Pilot Projects, 1st, Toledo, Spain, June 22-24, 1994. Proceedings, Paris, European Space Agency, Oct. 1994, p.149-152, ESA SP-365, 6 refs. Also presented at the 2nd Euro-Latin American Space Days, Buenos Aires, Argentina, May 9-13, 1994.

DLC QE33.2.A7W67 1994

Ice surveys, Sea ice distribution, Ice conditions, Ice reporting, Ice forecasting, Ice routing, Spaceborne photography, Radar tracking, Synthetic aperture radar, Baltic Sea

51-60

Evaluation of real-time use of ERS-1 SAR imagery for icebreaking operations in the Baltic.

Håkansson, B.G., Moberg, M., Thompson, T., Backman, A., Workshop on ERS-1 Pilot Projects, 1st, Toledo, Spain, June 22-24, 1994. Proceedings, Paris, European Space Agency, Oct. 1994, p.153-156, ESA SP-365, 2 refs.

DLC QE33.2.A7W67 1994

Ice surveys, Sea ice distribution, Ice conditions, Ice reporting, Ice routing, Icebreakers, Ice breaking, Spaceborne photography, Radar tracking, Synthetic aperture radar, Baltic Sea

51-61

Automatic satellite based sea ice monitoring system.

Boardman, D., Darwin, D., Martin, J., McIntyre, N., Sullivan, K., Workshop on ERS-1 Pilot Projects, 1st, Toledo, Spain, June 22-24, 1994. Proceedings, Paris, European Space Agency, Oct. 1994, p.157-162, ESA SP-365, 7 refs.

DLC QE33.2.A7W67 1994

Ice surveys, Sea ice distribution, Ice conditions, Ice detection, Ice reporting, Ice forecasting, Spaceborne photography, Radar tracking, Synthetic aperture radar

51-62

Towards a better utilization of SAR data in sea ice monitoring.

Shokr, M.E., Workshop on ERS-1 Pilot Projects, 1st, Toledo, Spain, June 22-24, 1994. Proceedings, Paris, European Space Agency, Oct. 1994, p.163-167, ESA SP-365, 5 refs.

DLC QE33.2.A7W67 1994

Ice surveys, Sea ice distribution, Ice conditions, Ice detection, Ice reporting, Ice forecasting, Spaceborne photography, Radar tracking, Synthetic aperture radar, Labrador Sea, Canada—Saint Lawrence, Gulf

51-63

Potential role of ERS-1 scatterometer data in support of ice navigation.

Ramseier, R.O., Arnon, I., Ezraty, R., Garrity, C., Gohin, F., Strübing, K., Workshop on ERS-1 Pilot Projects, 1st, Toledo, Spain, June 22-24, 1994. Proceedings, Paris, European Space Agency, Oct. 1994, p.169-174, ESA SP-365, 8 refs.

DLC QE33.2.A7W67 1994

Ice surveys, Sea ice distribution, Ice conditions, Ice reporting, Ice navigation, Ice routing, Radiometry, Backscattering, Radar tracking, Spaceborne photography, Antarctica—Weddell Sea

Ice information in support of navigation covers essentially any knowledge about ice conditions which might be useful to the master of the ship to decide which route to take and how to navigate around large ice floes. Satellite based sensors, primarily those operating in the microwave region, can provide this information day and night and under most weather conditions. To date, passive microwave brightness temperature data originating from sensors such as the Special Sensor Microwave/Imager are reasonably well understood, and can with suitable algorithms be presented as useable ice information products, such as ice concentration and extent. The scatterometer backscatter coefficient σ^0 has the potential of being a useful parameter to describe the surface conditions of an ice cover, in particular to provide a roughness index. Combined with passive microwave data, these complementary data sets can contribute better information on ice type and surface conditions which in return permits a better basis for route selection. This paper focuses on the use of scatterometer and passive microwave data and surface measurements made with the German RV *Polarstern* during its winter cruise in the Weddell Sea, June-July 1992. (Auth.)

51-64

ERS-1 SAR images and operational mapping of sea ice in the Greenland waters: preliminary results of a pilot project.

Nielsen, P., Pedersen, F.B., Valeur, H.H., Workshop on ERS-1 Pilot Projects, 1st, Toledo, Spain, June 22-24, 1994. Proceedings, Paris, European Space Agency, Oct. 1994, p.175-182, ESA SP-365.

DLC QE33.2.A7W67 1994

Ice surveys, Sea ice distribution, Ice conditions, Ice detection, Spaceborne photography, Synthetic aperture radar, Research projects, Greenland

51-65

Parameterization of lead formation in the Weddell Sea using SAR-derived ice velocity fields.

Thomas, M., Schulze, O., Brandt, R., Roth, R., Workshop on ERS-1 Pilot Projects, 1st, Toledo, Spain, June 22-24, 1994. Proceedings, Paris, European Space Agency, Oct. 1994, p.183-188, ESA SP-365, 16 refs. Also presented at the 2nd Euro-Latin American Space Days, Buenos Aires, Argentina, May 9-13, 1994.

DLC QE33.2.A7W67 1994

Ice surveys, Sea ice distribution, Ice conditions, Ice formation, Drift, Ice heat flux, Air ice water interaction, Ice openings, Polynyas, Spaceborne photography, Radar tracking, Synthetic aperture radar, Antarctica—Weddell Sea

The opening and closing of leads or polynyas in sea ice-covered regions governs the heat exchange between the ocean and the atmosphere. One of the most important questions in modeling dynamical and thermodynamical processes of sea ice is the temporal and spatial variability of open water/thin ice areas. To investigate this question, ice velocity fields are calculated from ERS-1 SAR images with 100m resolution along a transect at 67° southern latitude. The displacement vectors of significant ice structures are automatically generated by cross-correlations between pairs of SAR scenes from descending and ascending orbits. As an example, the divergence of an ice velocity field from July 14, 1992 is presented. Additionally, an ice classification approach based on radiometric and geometric properties and an estimation of sensible heat fluxes using additional meteorological data (synoptical analysis, ECMWF model) is shown. In free ice drift situations, the lead formation can be directly linked to the synoptic situation. (Auth.)

51-66

ERS SAR data as a tool for landform and lineament identification in previously glaciated areas.

Clark, C.D., Knight, J.K., Workshop on ERS-1 Pilot Projects, 1st, Toledo, Spain, June 22-24, 1994. Proceedings, Paris, European Space Agency, Oct. 1994, p.211-215, ESA SP-365, 17 refs.

DLC QE33.2.A7W67 1994

Glaciation, Glacial geology, Glacial erosion, Glacial deposits, Geological surveys, Topographic surveys, Terrain identification, Geomorphology, Spaceborne photography, Synthetic aperture radar

51-67

Pulsed dielectric spectroscopy of supercooled liquids.

Böhmer, R., Schiener, B., Hemberger, J., Chamberlin, R.V., *Zeitschrift für Physik B*, Nov. 1995, 99(1), p.91-99, 36 refs.

Supercooling, Liquid cooling, Spectroscopy, Electric fields, Dielectric properties, Low temperature research, Temperature effects, Laboratory techniques

51-68

Bering Sea ice dynamics and primary production.

Alexander, V., Henrichs, S.M., Niebauer, H.J., NIPR Symposium on Polar Biology, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.13-25, 44 refs.

Oceanography, Marine biology, Biomass, Ecosystems, Sea ice, Ice edge, Young ice, Ice water interface, Chlorophylls, Algae, Photosynthesis, Ice cover effect, Seasonal variations, Sampling, Bering Sea

51-69

Snow algal communities on arctic pack ice floes dominated by *Chlamydomonas nivalis* (Bauer) Wille.

Gradinger, R., Nürnberg, D., NIPR Symposium on Polar Biology, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.35-43, 34 refs.

Marine biology, Oceanography, Sea ice, Pack ice, Ice surface, Colored snow, Snow composition, Ice surface, Algae, Ecosystems, Sampling, Biomass, Arctic Ocean

51-70

Response of phytoplankton communities of the Bering and Chukchi Seas to certain organic pollutants and heavy metals.

Belevich, T.A., Korsak, M.N., NIPR Symposium on Polar Biology, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.131-139, 11 refs.

Marine biology, Ecosystems, Plankton, Water pollution, Metals, Biomass, Sampling, Environmental impact, Environmental tests, Chukchi Sea, Bering Sea

51-71

Relationship between distribution of bryophytes and soil conditions on deglaciated arctic terrain in Ny-Ålesund.

Minami, Y., Kanda, H., Masuzawa, T., NIPR Symposium on Polar Biology, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.307-312, 10 refs.

Plant ecology, Arctic landscapes, Mosses, Growth, Distribution, Biogeography, Vegetation patterns, Classifications, Moraines, Wetlands, Soil chemistry, Nutrient cycle, Norway—Spitsbergen

51-72

Adaptation in tundra plants exemplified by transplantation studies at low latitudes.

Wielgolaski, F.E., Johnson, E.E., NIPR Symposium on Polar Biology, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.313-324, 27 refs.

Plant ecology, Tundra vegetation, Tundra soils, Alpine landscapes, Growth, Biomass, Acclimatization, Cold weather survival, Insolation, Photosynthesis, Light effects, Sampling

51-73

Structure of *Eriophorum* tussock tundra ecosystem in northern Yukon Territory, Canada.

Kojima, S., NIPR Symposium on Polar Biology, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.325-333, 24 refs.

Plant ecology, Ecosystems, Grasses, Tundra vegetation, Tundra soils, Organic soils, Peat, Vegetation patterns, Soil profiles, Active layer, Geochemistry, Decomposition, Canada—Yukon Territory

51-74

Water relations of *Pinus pumila* in the snow melting season at the alpine region of Mt. Tateyama.

Maruta, E., Nakano, T., Ishida, A., Iida, H., Masuzawa, T., NIPR Symposium on Polar Biology, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.335-342, 9 refs.

Trees (plants), Forest canopy, Alpine landscapes, Growth, Forest lines, Plant tissues, Water balance, Transpiration, Cold stress, Snowmelt, Snow cover effect, Microclimatology, Temperature effects, Japan—Tateyama, Mount

51-75

Pedogenic groups and diagnostic characteristics in the Fildes Peninsula of King George Island, Antarctica.

Zhao, Y., Li, T.J., *Antarctic research*, June 1996, 7(1), p.70-78, 9 refs.

Soil formation, Soil analysis, Soil classification, Soil surveys, Climatic factors, Ecology, Antarctica—Fildes Peninsula

Based on the analysis of soil-forming factors, pedogenic processes and soil properties in the study area, the soil geographic and genetic classification of maritime-climatic subantarctic regions is proposed. Soils of the Fildes Peninsula were classified into 3 soil orders, 4 suborders and 13 soil groups. The relationship between the soil distribution and the environment is discussed. (Auth.)

51-76

Geometric and aerodynamic roughness of sea ice.

Mai, S., Wamser, C., Kottmeier, C., *Boundary-layer meteorology,* Feb. 1996, 77(3-4), p.233-248, 23 refs.

Sea ice, Marine atmospheres, Surface roughness, Pressure ridges, Aerial surveys, Lasers, Turbulent boundary layer, Air flow, Ice air interface, Topographic effects, Stress concentration, Wind velocity, Statistical analysis

51-77

On the synoptic hydrography of intermediate and deep water masses in the Iceland Basin.

van Aken, H.M., de Boer, C.J., *Deep sea research I,* Feb. 1996, 42(2), p.165-189, 34 refs.

Oceanography, Ocean currents, Advection, Hydrography, Turbulent diffusion, Statistical analysis, Structural analysis, Origin, Norwegian Sea, Labrador Sea

51-78

Recent developments in luminescence dating of Quaternary sediments.

Duller, G.A.T., *Progress in physical geography,* June 1996, 20(2), p.127-145, 51 refs.

Geochronology, Quaternary deposits, Sediments, Luminescence, Age determination, Laboratory techniques, Accuracy

51-79

Microtextures on quartz grains in tills from Antarctica.

Mahaney, W.C., Claridge, G., Campbell, I., *Palaeogeography, palaeoclimatology, palaeoecology,* Apr. 1996, 121(1-2), p.89-103, 34 refs.

Glacial geology, Glacial deposits, Glacial erosion, Sediment transport, Bedrock, Surface structure, Weathering, Abrasion, Microrelief, Scanning electron microscopy, Lithology

Quartz grains of the sand fractions from tills of Oligocene to Quaternary age in Antarctica were analyzed by scanning electron microscope to test the hypothesis that relative ice thickness and distance of transport influence the type and range of microtextures observed on individual grains. In this study, replicated subsamples were analyzed from tills emplaced by thick glaciers with both short and long transport distances. Till samples with grains transported over long distances under thick ice were compared with quartz grains from relatively thinner outlet glaciers with shorter transport distances. A range of microtextures was used to determine the environmental history of these grains. (Auth. mod.)

51-80

Study on sublimation phenomenon of horizontal frost layer exposed to forced convection air flow and radiant heat.

Inaba, H., Imai, S., *Journal of heat transfer,* Aug. 1996, 118(3), p.694-701, 3 refs.

Refrigeration, Heat transfer, Defrosting, Ice sublimation, Convection, Ice heat flux, Ice air interface, Radiant heating, Thermodynamic properties, Mass transfer, Analysis (mathematics)

51-81

Fundamental study on latent cold heat storage by means of direct-contact-freezing between oil droplets and cold water solution.

Inaba, H., Sato, K., *Journal of heat transfer,* Aug. 1996, 118(3), p.799-802, 9 refs.

Cold storage, Heat recovery, Latent heat, Hydrocarbons, Phase transformations, Drops (liquids), Dispersions, Temperature effects, Spray freezing, Solidification

51-82

Lumped-element analysis of subglacial hydraulic circuits.

Clarke, G.K.C., *Journal of geophysical research,* Aug. 10, 1996, 101(B8), p.17,547-17,559, 23 refs.

Glacial hydrology, Hydraulics, Subglacial drainage, Water storage, Seasonal variations, Mathematical models, Simulation, Flow measurement

51-83

Geologic and topographic controls on fast flow in the Laurentide and Cordilleran ice sheets.

Marshall, S.J., Clarke, G.K.C., Dyke, A.S., Fisher, D.A., *Journal of geophysical research,* Aug. 10, 1996, 101(B8), p.17,827-17,839, 54 refs.

Pleistocene, Ice sheets, Glacial geology, Ice solid interface, Basal sliding, Glacier beds, Deformation, Ice mechanics, Glacier oscillation, Glacier flow, Stability, Topographic effects, Mathematical models, Statistical analysis

51-84

Modeling convective transitions in the presence of sea ice.

Lenderink, G., Haarsma, R.J., *Journal of physical oceanography,* Aug. 1996, 26(8), p.1448-1467, 30 refs.

Oceanography, Ocean currents, Sea ice, Convection, Ice water interface, Ice cover effect, Mathematical models, Ice models, Thermodynamics, Salinity, Heat flux, Stability

51-85

Biomass and production of two vascular plants in a boreal mesotrophic fen.

Saarinen, T., *Canadian journal of botany,* June 1996, 74(6), p.934-938, With French summary. 26 refs.

Ecosystems, Plants (botany), Plant physiology, Wetlands, Subarctic landscapes, Biomass, Distribution, Roots, Peat, Organic soils, Sampling, Statistical analysis

51-86

Comparison of analytical approaches for assessing freezing damage in black spruce using electrolyte leakage methods.

Odlum, K.D., Blake, T.J., *Canadian journal of botany,* June 1996, 74(6), p.952-958, With French summary. 26 refs.

Trees (plants), Plant physiology, Freezing, Frost resistance, Damage, Plant tissues, Cold tolerance, Cold weather tests, Electrical measurement, Electrical resistivity, Temperature effects, Statistical analysis

51-87

Arctic systems: natural environments, human actions, nonlinear processes. Final report.

International Arctic Science Committee, Wright, J.L., ed, Sheehan, C.W., ed, International Conference for Arctic Research Planning, International Arctic Science Committee. Report No.4, Norway, 9512, 152p.

Oceanography, Polar atmospheres, Arctic landscapes, Ecosystems, Climatology, Glaciology, Global change, Environmental protection, Long range forecasting, Research projects, International cooperation

51-88

Sublittoral epifaunal communities at Signy Island, Antarctica. I. The ice-foot zone.

Barnes, D.K.A., *Marine biology,* Jan.1995, 121(3), p.555-563, 70 refs.

Marine biology, Sea ice, Littoral zone, —South Orkney Islands, —Signy Island

Photographs were taken every 0.5 m along three transects of 5.5 m length on shallow rock faces at Signy I. during the austral summer of 1991-92. The percentage cover of substratum ranged from 0 to 100% and the colonizing communities included representatives of ten phyla. The zone from mean low-water neap level to 1.5 m depth was mostly devoid of organisms as a result of the seasonal formation of the encrusting ice foot. Coralline and macroalgae dominated from 2 to 3 m and animal groups from 3.5 to 5.5 m. Bryozoans, followed by sponges, were the most abundant animal phyla. Within the bryozoans a succession of colonization of different species was observed, the most abundant two of which occupied >80% of substratum in places. Substratum type seemed to be the main factor influencing community development in the shallow sublittoral at Signy I. (Auth. mod.)

51-89

Rotating disk electrode voltammetry for studying kinetics of metal complex dissociation of model solutions and snow samples.

Chakrabarti, C.L., Cheng, J., Lee, W.F., *Environmental science and technology,* Apr. 1996, 30(4), p.1245-1252, 33 refs.

Measuring instruments, Metals, Electrical measurement, Snow samplers, Snow impurities, Models

51-90

Polycyclic aromatic hydrocarbon composition and potential sources for sediment samples from the Beaufort and Barents Seas.

Yunker, M.B., et al, *Environmental science and technology,* Apr. 1996, 30(4), p.1310-1320, 62 refs.

Sediments, Hydrology, Water pollution, Hydrocarbons, Sea water, Chemical composition, Arctic Ocean, Beaufort Sea, Barents Sea

51-91

Isolation of mutations affecting the development of freezing tolerance in *Arabiodopsis thaliana* (L.) Heynh.

Warren, G., McKown, R., Marin, A., Teutonico, R., *Plant physiology,* Aug. 1996, 111(4), p.1011-1019, 27 refs.

Plant physiology, Plant tissues, Frost resistance, Chemical properties, Modification, Chemical analysis, Low temperature tests

51-92

Profiler measurements of turbulence and wind shear in a snowstorm.

Rogers, R.R., Leblanc, S.G., Cohn, S.A., Ecklund, W.L., Carter, D.A., Wilson, J.S., *Contributions to atmospheric physics,* Feb. 1996, 69(1), p.27-36, 17 refs.

Precipitation (meteorology), Snowstorms, Cloud physics, Turbulent boundary layer, Turbulent flow, Shear flow, Wind velocity, Velocity measurement, Snow air interface, Radio echo soundings, Profiles, Statistical analysis

51-93

Surface ozone at the elevated site Åreskutan and its connection with the vertical distribution of ozone over Scandinavia.

Bazhanov, V., Rodhe, H., *Contributions to atmospheric physics,* Feb. 1996, 69(1), p.153-160, 25 refs.

Climatology, Subpolar regions, Polar atmospheres, Atmospheric boundary layer, Atmospheric composition, Ozone, Seasonal variations, Sounding, Profiles, Distribution, Statistical analysis, Correlation, Sweden—Åreskutan

51-94

Gas exchange and growth of three arctic tree-line tree species under different soil temperature and drought preconditioning regimes.

Landhäusser, S.M., Wein, R.W., Lange, P., *Canadian journal of botany,* May 1996, 74(5), p.686-693, With French summary. 31 refs.

Plant ecology, Plant physiology, Arctic landscapes, Trees (plants), Forest lines, Distribution, Biomass, Growth, Soil temperature, Vapor transfer, Photosynthesis, Water balance, Cold weather survival

51-95

Identifying the tundra-forest border in the stomate record: an analysis of lake surface samples from the Yellowknife area, Northwest Territories, Canada.

Hansen, B.C.S., MacDonald, G.M., Moser, K.A., *Canadian journal of botany,* May 1996, 74(5), p.796-800, With French summary. 13 refs.

Plant ecology, Paleoecology, Palynology, Trees (plants), Limnology, Lacustrine deposits, Suspended sediments, Forest lines, Forest tundra, Tundra vegetation, Sampling, Vegetation patterns, Canada—Northwest Territories—Yellowknife

51-96

Relationships from mountain permafrost and snow cover: preliminary results (Valtellina, Italy). [Relazioni tra permafrost alpine e coperture nevosa: risultati preliminar (Area del Foscagno, Sondrio, Italia)]

Guglielmin, M., Tellini, C., *Comitato glaciologico italiano. Bollettino. Ser.3: Geografia fisica e dinamica quaternia,* 1995, 18(1), p.25-29, In Italian with English summary. 11 refs.

Alpine landscapes, Geomorphology, Permafrost transformation, Permafrost preservation, Snow cover effect, Snow temperature, Profiles, Rock glaciers, Snow heat flux, Snow thermal properties, Solifluction, Italy—Valtellina

51-97

AAR Factor, snow variations and climatic fluctuations on the glaciers in the Alps of Lombardy (Italy). [Fattore AAR (Accumulation Area Ratio), variazioni frontali e relazioni con il clima sui ghiacciai delle Alpi Lombarde]

Pelfini, M., Smiraglia, C., *Comitato glaciologico italiano. Bollettino. Ser.3: Geografia fisica e dinamica quaternia,* 1995, 18(1), p.47-56, In Italian with English summary. 19 refs.

Alpine glaciation, Climatic changes, Glacier mass balance, Glacier tongues, Glacier oscillation, Seasonal variations, Glacier surveys, Sampling, Italy—Lombardy

51-98

Reports on the Glaciological Survey of 1994. [Relazioni della Campagna Glaciologica 1994]

Armando, E., Smiraglia, C., Zanon, G., *Comitato glaciologico italiano. Bollettino. Ser.3: Geografia fisica e dinamica quaternia,* 1995, 18(1), p.77-135, In Italian.

Glacier surveys, Alpine glaciation, Glacier oscillation, Mountain glaciers, Seasonal variations, Italy—Alps

51-99

Diagnosis of cirrus cloud occurrence using large-scale analysis data and a cloud-scale model.

Cautenet, G., Gbe, D., *Annales geophysicae,* July 1996, 14(7), p.753-766, 29 refs.

Climatology, Clouds (meteorology), Cloud physics, Cloud cover, Weather forecasting, Ice vapor interface, Ice sublimation, Ice crystal structure, Ice density, Humidity, Water vapor, Mathematical models

51-100

Arctic soils and permafrost: introduction.

Walker, M.D., *Arctic and alpine research,* Aug. 1996, 28(3), p.254-256, 13 refs.

Permafrost physics, Permafrost structure, Frozen ground mechanics, Soil surveys, Phase transformations, Classifications, Active layer, Ecosystems

51-101

Historical developments of polar pedology and the major contributions of Kaye Ronald Everett.

Brown, J., Tedrow, J.C.F., *Arctic and alpine research,* Aug. 1996, 28(3), p.257-266, Refs. p.263-266.

Soil science, Tundra soils, Geomorphology, Permafrost physics, Permafrost surveys, Soil classification, Research projects, Soil air interface

51-102

Characteristics of changing permafrost temperatures in the Alaskan Arctic, U.S.A.

Osterkamp, T.E., Romanovsky, V.E., *Arctic and alpine research,* Aug. 1996, 28(3), p.267-273, 28 refs.

Frozen ground thermodynamics, Permafrost heat transfer, Active layer, Boreholes, Soil temperature, Temperature variations, Soil profiles, Diurnal variations, Periodic variations, United States—Alaska

51-103

Response of near-surface permafrost to seasonal regime transitions in tundra terrain.

Outcalt, S.I., Hinkel, K.M., *Arctic and alpine research,* Aug. 1996, 28(3), p.274-283, 23 refs.

Frozen ground thermodynamics, Active layer, Tundra terrain, Soil temperature, Diurnal variations, Permafrost thermal properties, Permafrost heat transfer, Seasonal freeze thaw, Seasonal variations, Phase transformations, Thermal diffusion

51-104

Application of a fully predictive model for secondary frost heave.

Krantz, W.B., Adams, K.E., *Arctic and alpine research,* Aug. 1996, 28(3), p.284-293, 48 refs.

Frozen ground mechanics, Frost heave, Frost penetration, Soil freezing, Regelation, Ice lenses, Soil water migration, Freezing front, Frost forecasting, Mathematical models

51-105

Concurrent permafrost aggradation and degradation induced by forest clearing, central Alaska, U.S.A.

Nicholas, J.R.J., Hinkel, K.M., *Arctic and alpine research,* Aug. 1996, 28(3), p.294-299, 26 refs.

Discontinuous permafrost, Thermal regime, Permafrost transformation, Permafrost preservation, Active layer, Degradation, Thermokarst, Trenching, Environmental impact, Vegetation factors

51-106

Temporal changes in moisture content of the active layer and near-surface permafrost at Barrow, Alaska, U.S.A.: 1962-1994.

Hinkel, K.M., Nelson, F.E., Shur, IU.L., Brown, J., Everett, K.R., *Arctic and alpine research,* Aug. 1996, 28(3), p.300-310, 49 refs.

Permafrost mass transfer, Permafrost hydrology, Active layer, Moisture transfer, Soil water migration, Boreholes, Soil analysis, Drill core analysis, Seasonal variations, Statistical analysis, United States—Alaska—Barrow

51-107

Hydrology of a tundra wetland complex on the Alaskan arctic coastal plain.

Rovansek, R.J., Hinzman, L.D., Kane, D.L., *Arctic and alpine research,* Aug. 1996, 28(3), p.311-317, 29 refs.

Tundra terrain, Tundra vegetation, Wetlands, Arctic landscapes, Hydrology, Sampling, Water level, Water balance, Snowmelt, Seepage, Evapotranspiration, Seasonal variations, United States—Alaska

51-108

Modeling the influence of hydrological processes on spatial and temporal patterns of CO_2 soil efflux from an arctic tundra catchment.

Ostendorf, B., *Arctic and alpine research,* Aug. 1996, 28(3), p.318-327, 40 refs.

Tundra soils, Ecosystems, Tundra vegetation, Soil air interface, Vapor transfer, Carbon dioxide, Soil chemistry, Hydrologic cycle, Mathematical models, Vegetation factors, Geochemical cycles

51-109

Diurnal and seasonal patterns of ecosystem CO_2 efflux from upland tundra in the foothills of the Brooks Range, Alaska, U.S.A.

Oberbauer, S.F., Gillespie, C.T., Cheng, W.X., Sala, A., Gebauer, R., Tenhunen, J.D., *Arctic and alpine research,* Aug. 1996, 28(3), p.328-338, 31 refs.

Ecosystems, Tundra soils, Tundra vegetation, Biomass, Soil microbiology, Soil air interface, Vapor transfer, Carbon dioxide, Diurnal variations, Seasonal variations, Microclimatology, Vegetation factors, United States—Alaska—Brooks Range

51-110

Elemental mobility through small tundra watersheds.

Marion, G.M., MP 3889, *Arctic and alpine research,* Aug. 1996, 28(3), p.339-345, 39 refs.

Ecosystems, Tundra soils, Watersheds, Tundra vegetation, Soil chemistry, Leaching, Nutrient cycle, Geochemical cycles, Simulation, Statistical analysis

This paper summarizes a 4-yr irrigation-fertilization experiment designed to evaluate elemental mobility through small tundra watersheds and examines the "leaky ecosystem-nutrient" hypothesis. Soil solutions were saturated with respect to gibbsite, suggesting that a gibbsite-like mineral may control Al solubility in these arctic soils. Comparisons of elemental concentrations among tundra ecosystems indicate that weathering rates are highly individualistic, depending critically on soil parent material. Furthermore, tundra ecosystems are leaky with respect to nutrients, which may have ramifications well beyond the disturbance both with respect to time and space, and warrants attention in assessing the future response of tundra ecosystems.

51-111

Road dust alters extracellular enzyme activities in tussock tundra soils, Alaska, U.S.A.

Moorhead, D.L., Linkins, A.E., Everett, K.R., *Arctic and alpine research,* Aug. 1996, 28(3), p.346-351, 35 refs.

Ecosystems, Tundra soils, Decomposition, Dust, Roads, Aerosols, Dispersions, Turbulent exchange, Microclimatology, Environmental impact, Models, United States—Alaska

51-112

Soil development as an indicator of relative pingo age, northern Alaska, U.S.A.

Walker, M.D., Everett, K.R., Walker, D.A., Birkeland, P.W., *Arctic and alpine research,* Aug. 1996, 28(3), p.352-362, 73 refs.

Soil formation, Pleistocene, Pingos, Frozen ground expansion, Age determination, Geomorphology, Classifications, Soil profiles, Anisotropy, Statistical analysis, United States—Alaska

51-113

Changes in live plant biomass, primary production, and species composition along a riverside toposequence in arctic Alaska, U.S.A.

Shaver, G.R., Laundre, J.A., Giblin, A.E., Nadelhoffer, K.J., *Arctic and alpine research,* Aug. 1996, 28(3), p.363-379, 56 refs.

Tundra terrain, Tundra vegetation, Vegetation patterns, Biomass, Nutrient cycle, Plant ecology, Classifications, Microclimatology, Topographic effects, Sampling, Statistical analysis, Geobotanical interpretation, United States—Alaska

51-114

Coupling of soils and vegetation in peatland succession.

Klinger, L.F., *Arctic and alpine research,* Aug. 1996, 28(3), p.380-387, 86 refs.

Peat, Ecosystems, Swamps, Subarctic landscapes, Landscape development, Revegetation, Vegetation patterns, Soil formation, Soil profiles, Vegetation factors, Podsol, Sampling

51-115

State factor control of soils and forest succession along the Tanana River in interior Alaska, U.S.A.

Van Cleve, K., Viereck, L.A., Dyrness, C.T., *Arctic and alpine research,* Aug. 1996, 28(3), p.388-400, 39 refs.

Ecosystems, Taiga, Floodplains, Revegetation, Plant ecology, Vegetation patterns, Soil chemistry, Nutrient cycle, Geochemical cycles, Sampling, Topographic effects, United States—Alaska—Tanana River

51-116

Chemical species spatial distribution and relationship to elevation and snow accumulation rate over the Greenland ice sheet.

Yang, Q., Mayewski, P.A., Linder, E., Whitlow, S., Twickler, M., *Journal of geophysical research,* Aug. 20, 1996, 101(D13), p.18,629-18,637, 23 refs.

Climatology, Ice sheets, Sampling, Snow composition, Snow accumulation, Atmospheric composition, Aerosols, Distribution, Scavenging, Sampling, Snow air interface, Ion density (concentration), Statistical analysis, Seasonal variations, Altitude, Greenland

51-117

Water soluble dicarboxylic acids and related compounds in antarctic aerosols.

Kawamura, K., Seméré, R., Imai, Y., Fujii, Y., Hayashi, M., *Journal of geophysical research,* Aug. 20, 1996, 101(D13), p.18,721-18,728, 26 refs.

Polar atmospheres, Climatology, Atmospheric composition, Atmospheric boundary layer, Aerosols, Organic nuclei, Solubility, Photochemical reactions, Sampling, Air ice water interaction, Antarctica—Showa Station

In this paper, the authors studied antarctic aerosol samples at Showa Station for low molecular weight dicarboxylic acids, ketocarboxylic acids, and α-dicarbonyls using gas chromatography and mass spectrometry. The aerosols were also analyzed for total carbon and nitrogen content. Molecular distributions of these water soluble organic compounds and a large increase of their concentrations during summertime are related. Also discussed is the source of the dicarboxylic acids in the antarctic aerosols, in comparison with their molecular distributions in the Arctic and in the Northern Hemisphere. (Auth. mod.)

51-118

Filtering of air through snow as a mechanism for aerosol deposition to the antarctic ice sheet.

Harder, S.L., Warren, S.G., Charlson, R.J., Covert, D.S., *Journal of geophysical research*, Aug. 20, 1996, 101(D13), p.18,729-18,743, 42 refs.

Climatology, Polar atmospheres, Aerosols, Sedimentation, Snow air interface, Turbulent diffusion, Filters, Snow composition, Blowing snow, Snow permeability, Sampling, Particle size distribution, Antarctica—Amundsen-Scott Station

In this paper the authors describe snow in the general framework of the theory of filters. Aerosol particle size distribution at the South Pole were measured for air drawn through snow filters of various lengths and flow rates. The authors compare the results to those of previous experiments and to a theoretical model for wind pumping. Three filter-theory models for aerosol deposition are tested using the data, and a temporal deposition coefficient is determined. The filter-theory models, as applied to the typical densities, pore-space sizes, and grain sizes of snow, are examined in detail. (Auth. mod.)

51-119

Chlorine deactivation in the lower stratospheric polar regions during late winter: results from UARS.

Santee, M.L., et al, *Journal of geophysical research*, Aug. 20, 1996, 101(D13), p.18,835-18,859, Refs. p.18,856-18,859.

Polar atmospheres, Climatology, Air pollution, Aerosols, Atmospheric density, Degradation, Polar stratospheric clouds, Radiometry, Heterogeneous nucleation, Turbulent diffusion

In this paper the authors use data from the Upper Atmosphere Research Satellite (UARS) to examine chlorine reservoir recovery in the lower stratospheric polar regions of both hemispheres. Microwave Limb Sounder (MLS) measurements of ClO within the polar vortices are correlated with simultaneous Cryogenic Limb Array Etalon Spectrometer (CLAES) observations of $ClONO_2$ and Halogen Occultation Experiment (HALOE) observations of HCl obtained shortly after the MLS and CLAES data. The authors analyze time series of vortex-averaged mixing ratios on two potential temperature surfaces (585 K and 465 K) in the lower stratosphere. Late-winter balance between the decay of reactive chlorine and the growth of chlorine reservoir species based on these data sets are presented, and the observational results with those from a chemical transport model are compared. (Auth. mod.)

51-120

Analysis of UARS data in the southern polar vortex in September 1992 using a chemical transport model.

Chipperfield, M.P., et al, *Journal of geophysical research*, Aug. 20, 1996, 101(D13), p.18,861-18,881, 41 refs.

Climatology, Polar atmospheres, Stratosphere, Radiometry, Aerosols, Air pollution, Atmospheric density, Degradation, Turbulent diffusion, Wind factors, Simulation, Ozone

The authors have used a new isentropic-coordinate three-dimensional chemical transport model to investigate the decay of ClO and evolution of other species in the antarctic polar vortex during Sep. 1992. The model is initialized using the available data from the Microwave Limb Sounder and Cryogenic Limb Array Etalon Spectrometer on the Upper Atmosphere Research Satellite (UARS). During the model initialization the chemical inconsistencies in the UARS data became evident. Sampling the observed species in the same way as the UARS instruments is important in removing any spurious trends due, for example, to changing solar zenith angle. While the model can reproduce the magnitude of the MLS ClO observations at 585 K, this is not possible at 465 K. The observations require that effectively all of the inorganic chlorine is in the form of ClO and $ClONO_2$ in the inner vortex at this altitude. The results indicate the potential importance of the speculative reaction between OH and ClO producing HCl for the recovery of HCl in the antarctic spring. The most significant discrepancy for O_3 is in the inner vortex at 465 K where the model underestimates the observed O_3 loss rate, especially when the effects of vertical motion are included. (Auth. mod.)

51-121

Water ice in the disk around the protostar AFGL 2136 IRS 1.

Kastner, J.H., Weintraub, D.A., *Astrophysical journal*, Aug. 1, 1996, 46(2)pt.2, p.L103-L107, 13 refs.

Cosmic dust, Remote sensing, Extraterrestrial ice, Infrared spectroscopy, Radiation absorption, Ice optics, Ice growth, Ice detection, Scattering, Spectra, Photometry

51-122

History of the Pielinen ice lake. [Pielisen jääjärven kehityshistoria]

Miettinen, A., *Terra*, 1996, 108(1), p.14-19, In Finnish with English summary. 16 refs.

Limnology, Geomorphology, Lake ice, Ice edge, Water level, Shoreline modification, Surface drainage, Lacustrine deposits, Lithology, Sampling, Finland—Pielinen, Lake

51-123

Complexity of the Quaternary at Bellefosse (western slope of the Champ-du-Feu massif, Bas-Rhin, northern Vosges). [Complexité du Quaternaire à Bellefosse (flanc W du Champ-du-Feu, Bas-Rhin, Vosges du Nord)]

Tricart, J., Trautmann, M., *Revue de géomorphologie dynamique*, 1994, 43(4), p.113-124, In French with English summary. 6 refs.

Pleistocene, Geomorphology, Mountain soils, Glacial geology, Moraines, Quaternary deposits, Glacier oscillation, Glacial erosion, Periglacial processes, Weathering, France—Vosges Mountains

51-124

"Commons" concerns in search of uncommon solutions: arctic contaminants, catalyst of change?

Doubleday, N.C., *Science of the total environment*, July 18, 1996, 186(1-2), International Conference on Marine Mammals and the Marine Environment, Lerwick, Shetland, Apr. 20-21, 1995. Collected papers, p.169-179, 37 refs.

Oceanography, Air pollution, Water pollution, Environmental protection, International cooperation, Natural resources, Petroleum industry, Arctic Ocean

51-125

Global changes in environment.

Dobretsov, N.L., Kovalenko, V.I., *Russian geology and geophysics*, 1995, 36(8), p.5-27, Translated from Geologiia i geofizika. 30 refs.

Paleoclimatology, Climatic changes, Global change, Permafrost transformation, Permafrost heat balance, Geothermal thawing, Periodic variations, Tectonics

51-126

Climatic changes and biotic events.

Chumakov, N.M., *Russian geology and geophysics*, 1995, 36(8), p.28-36, Translated from Geologiia i geofizika. 48 refs.

Paleoclimatology, Paleoecology, Climatic changes, Global change, Periodic variations, Oscillations, Environmental impact

51-127

Changes in environment and climate during Early Pliocene in the southern West-Siberian plain.

Zykin, V.S., Zazhigin, V.S., Zykina, V.S., *Russian geology and geophysics*, 1995, 36(8), p.37-47, Translated from Geologiia i geofizika. 68 refs.

Paleoclimatology, Paleoecology, Climatic changes, Subpolar regions, Plains, Quaternary deposits, Stratigraphy, Classifications, Long range forecasting, Landscape development, Russia—Siberia

51-128

Natural and climatic changes in West Siberia during the first third of the next century.

Arkhipov, S.A., Volkova, V.S., Zykina, V.S., Bakhareva, V.A., Gus'kov, A.S., Levchuk, L.K., *Russian geology and geophysics*, 1995, 36(8), p.48-68, Translated from Geologiia i geofizika. 58 refs.

Paleoclimatology, Climatic changes, Global warming, Long range forecasting, Subpolar regions, Tundra climate, Quaternary deposits, Stratigraphy, Geochronology, Paleoecology, Palynology, Russia—Siberia

51-129

Geothermal model of the West-Siberian permafrost.

Duchkov, A.D., Balobaev, V.T., Deviatkin, V.N., An, V.V., Sokolova, I.S., *Russian geology and geophysics*, 1995, 36(8), p.69-79, Translated from Geologiia i geofizika. 6 refs.

Climatology, Climatic changes, Global warming, Long range forecasting, Permafrost transformation, Degradation, Permafrost distribution, Permafrost heat balance, Frozen ground temperature, Boreholes, Temperature gradients, Geothermal thawing, Russia—Siberia

51-130

Late Cenozoic paleoclimates in the Baikal region.

Vorob'eva, G.A., Mats, V.D., Shimaraeva, M.K., *Russian geology and geophysics*, 1995, 36(8), p.80-93, Translated from Geologiia i geofizika. 41 refs.

Paleoclimatology, Climatic changes, Quaternary deposits, Stratigraphy, Lithology, Weathering, Models, Russia—Baykal

51-131

Experience of reconstruction of Baikal hydrophysical conditions in the Late Pleistocene and Holocene.

Shimaraev, M.N., Granin, N.G., Kuimova, L.N., *Russian geology and geophysics*, 1995, 36(8), p.94-99, Translated from Geologiia i geofizika. 17 refs.

Paleoclimatology, Limnology, Paleoecology, Plankton, Lake ice, Ice breakup, Sedimentation, Lacustrine deposits, Water temperature, Quaternary deposits, Ice cover effect, Russia—Baykal, Lake

51-132

Railway forest—past and present.

Shimamura, M., Suzuki, H., *Japanese railway engineering*, Sep. 1995, No.134, p.19-22.

Railroad tracks, Avalanche protection, Forest strips, Snow fences, Blowing snow, Damage, Wind velocity

51-133

Speed limit control of high-speed trains in snowy regions.

Kawashima, K., Endo, T., Fujii, T., *Japanese railway engineering*, Sep. 1995, No.134, p.23-26, 4 refs.

Railroad tracks, Railroad cars, Velocity, Blowing snow, Snow mechanics, Snow water content, Ice accretion, Metamorphism (snow), Mechanical tests, Countermeasures

51-134

On the mesoscale structure of the intra-Alpine precipitation distribution during a typical winter snowfall event.

Obleitner, F., Mayr, G.J., *Meteorologische Zeitschrift*, 1996, 5(3), p.110-120, With German summary. 24 refs.

Climatology, Precipitation (meteorology), Distribution, Turbulent boundary layer, Snowstorms, Snowfall, Snow accumulation, Synoptic meteorology, Atmospheric circulation, Wind direction, Alpine landscapes, Topographic effects, Austria—Alps

51-135

Listing of temperatures at Arctic and Antarctic stations. *Climate monitor*, June 1994-Dec. 1994, 23(3-5), p.130-135.

Polar atmospheres, Climatology, Air temperature, Seasonal variations, Meteorological data

This index lists periodic 1994 air temperatures at various antarctic stations.

51-136

Arctic regions surface air temperature anomalies. *Climate monitor*, June 1994-Dec. 1994, 23(3-5), p.146-150.

Polar atmospheres, Climatology, Air temperature, Surface temperature, Meteorological data, Temperature variations, Seasonal variations

51-137

Freeze purification of water utilizing a cold plastic surface and ice-liquid separation with a centrifuge.

Ul Haq, E., *Separation science and technology,* 1996, 31(14), p.1971-1977, 7 refs.

Ice physics, Ice composition, Water treatment, Solutions, Impurities, Plastics, Ice solid interface, Ice crystal growth, Heterogeneous nucleation, Ice sublimation, Laboratory techniques, Dispersions, Mass transfer

51-138

Soil development on moraines of Mendenhall Glacier, southeast Alaska. 1. The moraines and soil morphology.

Alexander, E.B., Burt, R., *Geoderma,* July 1996, 72(1-2), p.1-17, 30 refs.

Glacial geology, Moraines, Soil formation, Podsol, Leaching, Soil profiles, Organic soils, Lithology, Particle size distribution, Sampling, Classifications, United States—Alaska—Mendenhall Glacier

51-139

Soil development on moraines of Mendenhall Glacier, southeast Alaska. 2. Chemical transformations and soil micromorphology.

Burt, R., Alexander, E.B., *Geoderma,* July 1996, 72(1-2), p.19-36, 44 refs.

Glacial geology, Moraines, Podsol, Organic soils, Soil formation, Weathering, Sampling, Thin sections, Microstructure, Chemical properties, Phase transformations, United States—Alaska—Mendenhall Glacier

51-140

Molecular characterization of soil organic matter in Pleistocene moraines from the Bolivian Andes.

Leinweber, P., Jordan, E., Schulten, H.R., *Geoderma,* July 1996, 72(1-2), p.133-148, 31 refs.

Pleistocene, Glacial geology, Moraines, Organic soils, Alpine landscapes, Sampling, Chemical composition, Spectroscopy, Ion density (concentration), Radioactive age determination, Bolivia—Andes

51-141

Peculiarities of methane clathrate hydrate formation and solid-state deformation, including possible superheating of water ice.

Stern, L.A., Kirby, S.H., Durham, W.B., *Science,* Sep. 27, 1996, 273(5283), p.1843-1848, 35 refs.

Ice deformation, Water chemistry, Superheated ice, Hydrates, Methane

51-142

Employment of ERS-1 SAR interferometry in Antarctica. [Application de l'interférométrie du SAR d'ERS-1 dans l'Antarctique]

Hartl, P., Thiel, K.H., Wu, X., Doake, C., Sievers, J., *Observation de la Terre. Bulletin trimestriel,* Mar. 1994, No.43, p.1-4, In French.

Remote sensing, Imaging, Radar, Ice surveys, Ice surface, Mapping, Image processing, LANDSAT, Antarctica—Hemmen Ice Rise, Antarctica—Berkner Island

Synthetic aperture radar (SAR) interferometry is described as a promising technique for polar research. It is used for setting up three-dimensional topographic maps; to detect and observe small changes in topographic models caused by ice movement; to measure surface velocities and the motion of sea water; to determine the grounding lines of the ice cover, and to follow the evolution of surface geophysical parameters. Some possibilities of the technique are discussed, and examples are presented of interferograms worked out from ERS-1 SAR data obtained over Antarctica.

51-143

Enhanced-resolution ERS-1 scatterometer imaging of antarctic ice. [Imagerie des glaces de l'Antarctique au moyen du diffusiomètre d'ERS-1 à résolution améliorée]

Drinkwater, M.R., Long, D.G., Early, D.S., *Observation de la Terre. Bulletin trimestriel,* Mar. 1994, No.43, p.4-6, In French.

Ice surveys, Remote sensing, Radar, Spaceborne photography, Imaging, Mapping, Glaciology

The ERS-1 AMI scatterometer was designed to determine wind speed and direction over the ocean. A new method of image reconstruction allows one to produce enhanced-resolution images (about 14 km), day or night, of areas where there are no SAR data for lack of receiving stations or during periods when the antarctic stations are closed. These images can be used to map the sea-ice dynamics of austral oceans and of the snow and ice areas of the antarctic ice cover.

51-144

Geological investigation in Antarctica using Landsat-TM data.

Casacchia, R., Picchiotti, A., Salvatori, R., *Earth observation quarterly,* Oct. 1992, No.39, p.1-4, 7 refs.

Topographic surveys, LANDSAT, Image processing, Photointerpretation, Spaceborne photography, Mapping, Ice surface, Low temperature research, Antarctica

Many research programs in Antarctica make systematic use of remote-sensing observations, in particular to monitor those processes relevant to global climatic-change studies. Due to the severe environmental and operating conditions in such an extended region, field surveys are extremely costly and difficult to carry out. It is suggested that remote-sensing techniques may provide the answer. Outstanding data at different spatial resolutions and wavelengths have so far been obtained over this area, and it is concluded that many more will be collected by future missions, especially in the microwave region of the spectrum. (Auth.)

51-145

Report on Greenland Operation, 1954.

Frye, F.J., et al, *U.S. Army Corps of Engineers. Engineer Research and Development Laboratories, Fort Belvoir, VA. ERDL report,* [1955], 24p., Reprinted in U.S. Army Corps of Engineers, Greenland Ice Cap Research Program, Studies completed in 1954, Vol.1, Feb. 1957.

Research projects, Cold weather operation, Highway planning, Snow roads, Pipelines, Route surveys, Crevasse detection, Water supply, Waste disposal, Sanitary engineering, Greenland

51-146

Report on Greenland Operation, 1955-1956.

Beigbeder, P.A., Smitherman, L.A., Leathers, H.W., Jr., *U.S. Army Corps of Engineers. Engineer Research and Development Laboratories, Fort Belvoir, VA. ERDL report,* [1957], 14p., Reprinted in U.S. Army Corps of Engineers, Greenland Ice Cap Research Program, Studies conducted in 1955-56, Vol.1, May 1958.

Research projects, Cold weather operation, Cold weather construction, Snow compaction, Ice runways, Crevasse detection, Greenland

51-147

Semi-empirical model for radar backscatter from snow at 35 and 95 GHz.

Ulaby, F.T., Siqueira, P., Nashashibi, A., Sarabandi, K., *IEEE transactions on geoscience and remote sensing,* Sep. 1996, 34(5), p.1059-1065, 5 refs. For another source see 49-6553.

Remote sensing, Radar echoes, Snow physics, Snow cover structure, Snow depth, Snow optics, Backscattering, Ice crystal size, Radiation balance, Snow cover effect, Models

51-148

Temporal change in the extinction coefficient of snow on the Greenland ice sheet from an analysis of Seasat and Geosat altimeter data.

Davis, C.H., *IEEE transactions on geoscience and remote sensing,* Sep. 1996, 34(5), p.1066-1073, 28 refs. For another source see 49-6512.

Remote sensing, Glacier surveys, Ice sheets, Sensor mapping, Snow cover structure, Height finding, Radar echoes, Attenuation, Scattering, Snow optics, Wave propagation, Snow cover effect, Data processing, Greenland

51-149

Phase matrix for a dense discrete random medium: evaluation of volume scattering coefficient.

Chuah, H.T., Tjuatja, S., Fung, A.K., Bredow, J.W., *IEEE transactions on geoscience and remote sensing,* Sep. 1996, 34(5), p.1137-1143, 20 refs.

Theories, Radio waves, Remote sensing, Scattering, Porous materials, Density (mass/volume), Dielectric properties, Snow optics, Wave propagation, Polarization (waves), Mathematical models, Simulation, Models

51-150

Fusion of satellite active and passive microwave data for sea ice type concentration estimates.

Beaven, S.G., Gogineni, S.P., Carsey, F., *IEEE transactions on geoscience and remote sensing,* Sep. 1996, 34(5), p.1172-1183, 34 refs.

Sea ice distribution, Ice surveys, Young ice, Freezeup, Ice cover thickness, Classifications, Sensor mapping, Remote sensing, Radiometry, Radar echoes, Synthetic aperture radar, Backscattering, Image processing

51-151

Simplified scheme for obtaining precipitation and vertical hydrometeor profiles from passive microwave sensors.

Kummerow, C., Olson, W.S., Giglio, L., *IEEE transactions on geoscience and remote sensing,* Sep. 1996, 34(5), p.1213-1232, 47 refs.

Precipitation (meteorology), Remote sensing, Radiometry, Radar echoes, Profiles, Brightness, Scattering, Snow pellets, Snow water content, Radiation balance, Cloud physics, Mathematical models

51-152

Corrections to "Least average residual algorithm (LARA) for tracking the motion of arctic sea ice".

Peddada, S., McDevitt, R., *IEEE transactions on geoscience and remote sensing,* Sep. 1996, 34(5), p.1288, For pertinent paper see 50-5686.

Sea ice, Drift, Ice floes, Remote sensing, Mathematical models, Statistical analysis

51-153

Electrothermodynamic model with distributed properties for effective permittivities of sea ice.

Nghiem, S.V., Kwok, R., Kong, J.A., Shin, R.T., Arcone, S.A., Gow, A.J., MP 3890, *Radio science,* Mar.-Apr. 1996, 31(2), p.297-311, 26 refs.

Sea ice, Ice physics, Thermodynamic properties, Electromagnetic properties, Wave propagation, Scattering, Ice microstructure, Ice models, Ice dielectrics, Solutions, Anisotropy, Mathematical models

This paper presents a model to calculate the temperature dependence of effective permittivities for sea ice, a heterogeneous medium containing multiphase scatterers. With the strong permittivity fluctuation approach, the model accounts for the electrodynamic scattering effect together with the quasi-static characteristics of multiple species and subspecies of inhomogeneities with distributed orientations, sizes, and shapes. Because of a preferential direction in the orientation distribution, the medium is effectively anisotropic. The size distribution is described with a probability density function in terms of normalized volumetric sizes. Scatterer shapes are nonuniform and have a general ellipsoidal form characterized by arbitrary axial ratios of correlation lengths which are related to physical geometries of the scatterers. In this formulation, sea ice consisting of solid ice, liquid brine, and gaseous inclusions is modeled to derive effective permittivities with thermodynamic phase redistribution and structural metamorphism. Theoretical results are in good agreement with experimental data at the C band frequency of 4.8 GHz for saline ice undergoing warming and cooling cycles. A competitive effect between the increase of liquid brine and the shape rounding of ellipsoidal scatterers at increasing temperatures explains the trend observed in measured data. Sensitivities of effective permittivities to structural and physical parameters characterizing sea ice are also studied.

51-154

Simulation of the methane hydrate/methane gas interface near hydrate forming conditions.

Rodger, P.M., Forester, T.R., Smith, W., *Fluid phase equilibria,* Mar. 15, 1996, 116(1-2), International Conference on Fluid Properties and Phase Equilibria for Chemical Process Design, 7th, Snowmass Village, CO, June 18-23, 1995. Proceedings, p.326-332, 16 refs.

Clathrates, Hydrates, Freezing, Interfaces, Thermodynamic properties, Natural gas, Latticed structures, Molecular energy levels, Melting points, Computerized simulation, Temperature effects

51-155

Design guidelines for the control of blowing and drifting snow.

Tabler, R.D., National Research Council. Strategic Highway Research Program. Report H-381, Washington, D.C., 1994, 364p., PB94 195328, var. ref.

Roads, Blowing snow, Snow accumulation, Countermeasures, Snow erosion, Snowdrifts, Snow air interface, Turbulent boundary layer, Standards, Design criteria, Wind factors, Topographic effects

51-156

Stratospheric ozone depletion.

Schoeberl, M.R., Atlas of satellite observations related to global change. Edited by R.J. Gurney et al, Cambridge, Cambridge University Press, 1993, p.59-65, 8 refs.

DLC QC981.8.C5G87

Polar atmospheres, Climatic changes, Atmospheric composition, Ozone, Degradation, Radiometry, Environmental impact

An important contribution to understanding the antarctic ozone hole has come from the total ozone observations made by the Total Ozone Mapping Spectrometer (TOMS) on board the polar orbiting Nimbus-7, launched in Nov. 1978. At this writing, TOMS has made over 4100 daily maps of the global total ozone distribution and the instrument is still in operation eleven years beyond its planned life-time. Not only has this instrument been valuable in understanding the antarctic ozone hole, but it has been used to map out nonpolar changes in the ozone layer as well. Large changes in the total column of ozone imply ozone loss in the lower stratosphere (10-30 km). At the time the ozone hole was discovered, stratospheric scientists were expecting anthropogenic ozone loss to take place first in the upper stratosphere (30-50 km) so the signal in total column ozone would be weak. Thus the spring depletion in antarctic ozone was a major surprise. This paper examines seasonal antarctic ozone depletion. (Auth. mod.)

51-157

Stratospheric aerosols.

McCormick, M.P., Atlas of satellite observations related to global change. Edited by R.J. Gurney et al, Cambridge, Cambridge University Press, 1993, p.67-77, 46 refs.

DLC QC981.8.C5G87

Climatic changes, Polar atmospheres, Stratosphere, Atmospheric composition, Aerosols, Optical properties, Photometry, Light scattering, Attenuation, Seasonal variations

Continuous monitoring of stratospheric aerosols globally requires remote measurements from satellites. NASA launched a series of such satellite instruments beginning in Oct. 1978. The first was the Stratospheric Aerosol Measurement II (SAM II) instrument aboard Nimbus-7. The second long-term instrument was the Stratospheric Aerosol and Gas Experiment I (SAGE I) launched aboard the Applications Explorer Mission 2 spacecraft (AEM 2) in Feb. 1979, followed by SAGE II launched aboard the Earth Radiation Budget Satellite (ERBS) in Oct. 1984. This paper will focus on the measurements from SAM II and SAGE I and II, with some supporting lidar data. Both polar atmospheres are included in the analysis. (Auth. mod.)

51-158

Snow cover.

Foster, J.L., Chang, A.T.C., Atlas of satellite observations related to global change. Edited by R.J. Gurney et al, Cambridge, Cambridge University Press, 1993, p.361-370, 16 refs.

DLC QC981.8.C5G87

Climatology, Global change, Snow surveys, Snow depth, Snow cover distribution, Sensor mapping, Spaceborne photography, Radiometry, Seasonal variations

51-159

Global sea ice coverage.

Parkinson, C.L., Gloersen, P., Atlas of satellite observations related to global change. Edited by R.J. Gurney et al, Cambridge, Cambridge University Press, 1993, p.371-383, 37 refs.

DLC QC981.8.C5G87

Oceanography, Climatic changes, Sea ice distribution, Ice surveys, Radiometry, Spaceborne photography, Sensor mapping, Seasonal variations

SAR data have much finer resolution than passive microwave data, so that they are less appropriate for routine global coverage but can be used for identifying individual ice floes and carrying out the types of detailed studies also possible with visible and near infra-red imagery, although with the major advantage of not being hindered by cloud or darkness. SAR instruments have flown on NASA's Seasat in 1978, on the European Remote Sensing Satellite (ERS-1), launched in 1991, and on the Japanese Earth Resources Satellite (JERS-1), launched in 1992. A SAR instrument is also planned for the Canadian Radarsat scheduled for launch in 1995. The Seasat SAR data have been used in several sea ice studies. This paper presents passive microwave data and the results obtained from them. Sea ice distribution in both polar regions is analyzed. (Auth. mod.)

51-160

Ice sheets.

Thomas, R.H., Atlas of satellite observations related to global change. Edited by R.J. Gurney et al, Cambridge, Cambridge University Press, 1993, p.385-400, 31 refs.

DLC QC981.8.C5G87

Ice sheets, Sensor mapping, Glacier surveys, Glacier thickness, Glacier mass balance, Height finding, Spaceborne photography, Radiometry, Radio echo soundings, Glacier oscillation, Resolution, Climatic changes

A variety of remote-sensing techniques can be applied to ice-sheet investigations in both polar regions, using energy with wavelengths ranging from microns to meters. Here, attention is focussed on those techniques that can be applied from satellites, but mention is also made of airborne techniques that complement satellite sensors. These sensors will be reviewed under the broad classifications of imaging sensors and instruments for measuring ranges. (Auth. mod.)

51-161

Glaciers.

Williams, R.S., Jr., Hall, D.K., Atlas of satellite observations related to global change. Edited by R.J. Gurney et al, Cambridge, Cambridge University Press, 1993, p.401-422, Refs. p.417-422.

DLC QC981.8.C5G87

Glacier surveys, Global change, Glacier mass balance, Glacier flow, Spaceborne photography, Resolution, Sensor mapping, Glacier oscillation, Classifications

51-162

Stability of the thermohaline circulation in analytical and numerical models. [Stabilität der thermohalinen Zirkulation in analytischen und numerischen Modellen]

Lohmann, G., *Berichte zur Polarforschung,* 1996, No.200, 128p., With German summary. 163 refs.

Ocean currents, Water chemistry, Salinity, Heat balance, Sea ice, Climatic changes, Models, North Atlantic Ocean

51-163

Viscoplasticity of ice and certain types of soils.

Razbegin, V.N., *Soil mechanics and foundation engineering,* May 1996, 32(6), p.181-192, Translated from Osnovaniia, fundamenty i mekhanika gruntov. 28 refs.

Frozen ground mechanics, Ice mechanics, Ice deformation, Viscoelasticity, Crack propagation, Plastic deformation, Mathematical models, Rheology, Structural analysis

51-164

Tundra disturbance studies, III: Short-term effects of aeolian sand and dust, Yamal region, northwest Siberia.

Forbes, B.C., *Environmental conservation,* 1995, 22(4), p.335-344, 57 refs.

Ecosystems, Permafrost transformation, Tundra soils, Degradation, Tundra vegetation, Vegetation patterns, Nutrient cycle, Eolian soils, Dust, Sedimentation, Environmental impact, Russia—Siberia

51-165

Use of the flow length concept to assess the efficiency of air entrainment with regards to frost durability: Part I—description of the test method.

Pleau, R., Pigeon, M., *Cement, concrete, and aggregates,* June 1996, 18(1), p.19-29, 19 refs.

Concrete durability, Frost resistance, Mechanical tests, Concrete admixtures, Freeze thaw cycles, Air entrainment, Flow measurement, Bubbles, Porosity, Microstructure, Mathematical models

51-166

Use of the flow length concept to assess the efficiency of air entrainment with regards to frost durability: Part II—experimental results.

Pleau, R., Pigeon, M., Laurencot, J.L., Gagné, R., *Cement, concrete, and aggregates,* June 1996, 18(1), p.30-41, 12 refs.

Concrete durability, Frost resistance, Mechanical tests, Freeze thaw tests, Concrete admixtures, Microstructure, Air entrainment, Porosity, Bubbles, Mass transfer, Flow measurement

51-167

Glacial comminution of quartz sand grains and the production of loessic silt: a simulation study.

Wright, J.S., *Quaternary science reviews,* Sep.-Oct. 1995, 14(7-8), p.669-680, 29 refs.

Glacial geology, Glacial erosion, Abrasion, Subglacial observations, Loess, Quaternary deposits, Lithology, Sediment transport, Simulation, Mechanical tests, Grain size, Scanning electron microscopy

51-168

Variations in loess and palaeosol properties as indicators of palaeoclimatic gradients across the loess plateau of North China.

Derbyshire, E., Kemp, R., Meng, X.M., *Quaternary science reviews,* Sep.-Oct. 1995, 14(7-8), p.681-697, Refs. p.694-697.

Paleoclimatology, Climatic changes, Quaternary deposits, Loess, Sedimentation, Eolian soils, Soil analysis, Particle size distribution, Stratigraphy, Magnetic properties, Thin sections, Scanning electron microscopy, China

51-169

Loess stratigraphy of central Asia: palaeoclimatic and palaeoenvironmental aspects.

Dodonov, A.E., Baiguzina, L.L., *Quaternary science reviews,* Sep.-Oct. 1995, 14(7-8), p.707-720, 47 refs.

Paleoclimatology, Pleistocene, Climatic changes, Atmospheric circulation, Quaternary deposits, Loess, Eolian soils, Paleoecology, Palynology, Sediment transport, Stratigraphy, Isotope analysis, Correlation, Russia—Siberia

51-170

Pleistocene paleosols in the loess and loess-like sediments of the central part of the Russia plain.

IAkimenko, E.IA., *Quaternary science reviews,* Sep.-Oct. 1995, 14(7-8), p.747-753, 10 refs.

Pleistocene, Quaternary deposits, Loess, Eolian soils, Sedimentation, Stratigraphy, Geochemistry, Soil formation, Diagenesis, Microstructure, Sampling, Russia

51-171

Deflation and redeposition of sand dunes in Finnish Lapland.

Seppälä, M., *Quaternary science reviews,* Sep.-Oct. 1995, 14(7-8), p.799-809, 32 refs.

Paleoecology, Subarctic landscapes, Quaternary deposits, Forest lines, Paleoecology, Loess, Sands, Eolian soils, Sedimentation, Stratigraphy, Geochronology, Radioactive age determination, Landscape development, Finland—Lapland

51-172

Chemical exchange between the atmosphere and polar snow.

Wolff, E.W., ed, Bales, R.C., ed, North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I: Global environmental change, Vol.43, Berlin, Springer-Verlag, 1996, 675p., Refs. passim. Proceedings of the NATO Advanced Research Workshop on Processes of Chemical Exchange Between the Atmosphere and Polar Snow, Il Ciocco, Italy, Mar. 19-23, 1995. For selected papers see 51-173 through 51-206 or F-55820 through F-55822, F-55827, F-55829, F-55831, F-55832, F-55834, I-55823 through I-55826, I-55828, I-55830 and I-55833.

DLC QC879.6.C45 1996

Polar atmospheres, Atmospheric circulation, Atmospheric composition, Air pollution, Scavenging, Snow air interface, Snow composition, Firn stratification, Ice composition, Ice cores, Paleoclimatology

The NATO Advanced Research Workshop (ARW) was held at Il Ciocco, Tuscany, Mar. 19-23, 1995. The main goal of the workshop was to assess, improve, and summarize understanding of the processes that control the transfer of species between the atmosphere and the record that is finally seen in ice cores. The organization of this book follows the organization of the meeting. The first 3 papers discuss ice core records, what they have shown, and some of the problems that have been recognized. The next 5 papers describe what is known about the atmospheric transport and chemical composition of the arctic and antarctic atmosphere. Understanding of atmospheric transport is required in order to relate the source regions to the ice sheet, and therefore to elucidate the spatial representativeness of ice core data. These themes were extended by the next 2 papers, one describing the chemical reactions occurring in the polar troposphere, the other setting polar data in the context of global models of the atmosphere. The next section of the book covers mainly the recent field data. The theme of looking at individual processes con-

tinues in the remaining chapters of this volume. Beyond the invited papers, a day was devoted to workshop sessions, where the problems of different types of species were extensively discussed and summarized. The three working group reports are included, and can be considered a summary of the state-of-the-art for this topic in 1995; they include recommendations for what future work is required. A brief conclusion for the ice core community follows these reports.

51-173

Record of aerosol deposited species in ice cores, and problems of interpretation.

Wolff, E.W., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.1-17, Refs. p.14-17.

DLC QC879.6.C45 1996

Polar atmospheres, Atmospheric composition, Atmospheric circulation, Aerosols, Air pollution, Snow composition, Ice composition, Ice cores, Paleoclimatology

This chapter aims to show the potential of ice cores to deliver information on paleoatmospheric chemistry. It gives a flavor of the data that exist, and explains some of the difficulties involved in interpreting the ice core profiles in terms of atmospheric changes. The chapter concentrates on the chemical species that are delivered to the snow as aerosol (that is, as solid or liquid particles).

51-174

Acidic gases (HCl, HF, HNO_3, HCOOH, and CH_3COOH): a review of ice core data and some preliminary discussions on their air-snow relationships.

Legrand, M., Léopold, A., Dominé, F., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.19-43, Refs. p.40-43.

DLC QC879.6.C45 1996

Polar atmospheres, Atmospheric composition, Air pollution, Snow air interface, Snow composition, Snow impurities, Ice composition, Ice cores, Gas inclusions, Paleoclimatology

This paper focusses on the records of mineral (HCl, HF, and HNO_3) and carboxylic (formic: HCOOH and acetic: CH_3COOH) acids from Greenland and antarctic firn and ice cores and their atmospheric significance. The authors review available ice records and examine to what extent reliable information can be extracted in terms of chemical composition of past atmospheres. The firn records span the time period from the pre-industrial era to the present and are useful in investigations of the impact of human activities on the natural budget of these acidic species. The changes in acidic species levels seen in deep ice cores are discussed, spanning the last climatic cycle. To what extent some of these changes can be attributed to changes in atmospheric concentrations, due to modification of source strength or/and transport following past climate fluctuations, is considered.

51-175

Record of gases and reactive species in ice cores, and problems of interpretation.

Neftel, A., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.45-69, Refs. p.67-69.

DLC QC879.6.C45 1996

Polar atmospheres, Atmospheric composition, Snow air interface, Snow composition, Ice sheets, Ice composition, Ice cores, Gas inclusions, Paleoclimatology, Greenland, Antarctica

Since the start of ice core drilling some 30 years ago, many different parameters have been measured and reported in the literature. Of great significance is the link to the corresponding atmospheric concentrations, which are related to the basic parameters of the Earth system. Ice, conserved well below the freezing point, contains 2 clearly distinguishable ways of carrying information of the past: composition of the gas enclosed in the bubbles, and trace species in the ice matrix. This paper focusses on the discussion of three "Earth system parameters": CO_2, H_2O_2 and HCHO. (Auth. mod.)

51-176

Atmospheric transport pathways for the Arctic.

Iversen, T., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.71-92, Refs. p.88-92.

DLC QC879.6.C45 1996

Polar atmospheres, Atmospheric circulation, Atmospheric composition, Air pollution, Ice cores, Paleoclimatology

51-177

Occurrence and trends of pollution in the arctic troposphere.

Barrie, L.A., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.93-129, Refs. p.123-129.

DLC QC879.6.C45 1996

Polar atmospheres, Marine atmospheres, Atmospheric circulation, Atmospheric composition, Air pollution

51-178

One year's continuous aerosol sampling at Summit in central Greenland.

Wåhlin, P., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.131-143, 16 refs.

DLC QC879.6.C45 1996

Polar atmospheres, Atmospheric circulation, Atmospheric composition, Air pollution, Aerosols, Scavenging, Snow composition, Greenland

51-179

Central Antarctica: atmospheric chemical composition and atmospheric transport.

Bodhaine, B.A., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.145-172, Refs. p.167-172.

DLC QC879.6.C45 1996

Polar atmospheres, Atmospheric circulation, Atmospheric composition, Air pollution, Aerosols, Scavenging, Snow composition, Antarctica—Amundsen-Scott Station

A vast literature analysis is presented of studies on atmospheric transport and chemical composition of the antarctic atmosphere. A map of Antarctica is included showing major geographic features and some of the scientific stations. Some of the research stations, including Amundsen-Scott, providing meteorological data over many years, are described.

51-180

Coastal Antarctica: atmospheric chemical composition and atmospheric transport.

Wagenbach, D., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.173-199, Refs. p.195-199.

DLC QC879.6.C45 1996

Polar atmospheres, Marine atmospheres, Atmospheric circulation, Atmospheric composition, Air pollution, Aerosols, Scavenging, Snow composition, Antarctica

Snow fields of the coastal antarctic region are situated intermediately between the vast environmental regimes of the high antarctic plateau and that of the southern ocean. Since they are directly exposed to moist maritime air masses, a relatively high snow accumulation rate, associated with the deposition of mainly marine derived aerosol species, makes this region unique to recover high resolution ice core records that reveal the environmental and climatic history of the southern ocean. Several extensive ice core studies which have been, or are currently, performed in coastal antarctic regions are discussed.

51-181

Chemical reactions in the polar troposphere relevant to C, S, and N compounds.

Bottenheim, J.W., Barrie, L.A., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.201-224, Refs. p.222-224.

DLC QC879.6.C45 1996

Polar atmospheres, Atmospheric composition, Air pollution, Ozone, Solar radiation, Photochemical reactions, Scavenging, Snow composition

51-182

Modeling framework for atmospheric trace gas measurements at the air-snow interface.

Thompson, A.M., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.225-248, Refs. p.246-248.

DLC QC879.6.C45 1996

Polar atmospheres, Atmospheric circulation, Atmospheric composition, Air pollution, Aerosols, Scavenging, Snow air interface, Snow composition

51-183

Overview of field data on the deposition of aerosol-associated species to the surface of polar glaciers, particularly recent work in Greenland.

Dibb, J.E., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.249-274, Refs. p.271-274.

DLC QC879.6.C45 1996

Polar atmospheres, Atmospheric circulation, Atmospheric composition, Air pollution, Aerosols, Scavenging, Snow air interface, Snow composition, Greenland

51-184

Deposition of particles and gases to ice sheets.

Davidson, C.I., Bergin, M.H., Kuhns, H.D., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.275-306, Refs. p.302-306.

DLC QC879.6.C45 1996

Polar atmospheres, Atmospheric composition, Scavenging, Snow air interface, Snow composition, Ice sheets, Ice composition, Ice cores, Mathematical models, Greenland, Antarctica

The deposition of particles and gases to ice sheets can occur by dry deposition, by wet deposition during formation and subsequent precipitation of snow, and by fog deposition. Each of these three mechanisms is discussed. The paper is essentially an update on descriptions of mechanisms presented in earlier reviews, with special attention given to recent advances in the understanding of deposition. The paper focuses on irreversibly depositing chemical species, beginning by presenting descriptions of the deposition mechanisms, with separate sections for dry, wet, and fog deposition. Experimental data illustrating these mechanisms for irreversible deposition are discussed. Finally, the authors summarize these findings and briefly discuss their implications for ice core research.

51-185

Overview of recent field experiments for the study of the air-snow transfer of H_2O and HCHO.

Fuhrer, K., Hutterli, M., McConnell, J.R., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.307-318, 27 refs.

DLC QC879.6.C45 1996

Polar atmospheres, Atmospheric composition, Scavenging, Snow air interface, Snow composition, Greenland, Antarctica—Queen Maud Land, Antarctica—Amundsen-Scott Station

The analysis of hydrogen peroxide and formaldehyde in ice cores offers the potential to reconstruct the oxidation capacity of the atmosphere in the past, since these species are closely linked to the odd H and the odd O budget of the atmosphere. The species are so-called reversibly deposited on the snow surface since they show a strong exchange with the gas phase after deposition and their ice concentra-

tions are dominated to a large extent by postdepositional changes in the firn. Therefore, the transfer from the atmosphere into the snow is an important step in the overall transfer function of these species. To get a better understanding of this step, several field experiments were carried out during the 1993 and 1994 summer seasons at Summit in Central Greenland, in the 1993-94 austral summer in Antarctica along the Swedish traverse (SWEDARP), and the Amundsen-Scott Station in Nov. and Dec. 1994. The authors give an overview of the data and point out possible contradictions and knowledge gaps. (Auth.)

51-186

Conceptual framework for interpretation of exchange processes.

Bales, R.C., Choi, J.Y., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.319-338, Refs. p.335-338.

DLC QC879.6.C45 1996

Polar atmospheres, Atmospheric composition, Snow air interface, Snow composition, Firn stratification, Ice sheets, Ice composition, Ice cores, Paleoclimatology, Mathematical models, Greenland, Antarctica—Amundsen-Scott Station

This paper addresses two central questions. First, what do we know about the processes governing the atmosphere-snow transfer for species that are "reversibly deposited" to snow? Reversibly deposited refers to species that have a significant presence in both the gas and condensed phases, and can undergo reversible exchange between snow or firn and the overlying atmosphere. Second, what more should we learn about the atmosphere-snow exchange process and subsequent changes in the snow/firn/ice in order to extract relevant climatic information about these species from ice-core records? This paper focuses on hydrogen peroxide (H_2O_2) as a model for the behavior of reversibly deposited species, though the conceptual model should also describe the behavior of formaldehyde (HCHO), nitric acid (HNO_3) and light organic acids (e.g. formic (HCOOH) and acetic (CH_3COOH)).

51-187

Processes at ice surfaces: physical uptake and reaction.

Ravishankara, A.R., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.339-352, 31 refs.

DLC QC879.6.C45 1996

Polar atmospheres, Atmospheric composition, Polar stratospheric clouds, Ozone, Ice sheets, Ice surface, Ice air interface, Ice composition

51-188

Possible chemical transformations in snow and ice induced by solar (UV photons) and cosmic irradiation (muons).

Hoffmann, M.R., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.353-377, Refs. p.374-377.

DLC QC879.6.C45 1996

Polar atmospheres, Atmospheric composition, Snow air interface, Ice air interface, Snow composition, Ice composition, Solar radiation, Ultraviolet radiation

51-189

Metamorphism of polar firn: significance of microstructure in energy, mass and chemical species transfer.

Davis, R.E., Arons, E.M., Albert, M.R., MP 3891, Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.379-401, Refs. p.398-401.

DLC QC879.6.C45 1996

Polar atmospheres, Atmospheric composition, Snow air interface, Snow composition, Snow heat flux, Metamorphism (snow), Depth hoar, Firn stratification, Ice composition, Ice microstructure

Energy, mass transfer and grain recrystallization processes show the most dynamic variation in the upper few meters of polar firn. The understanding of processes in dry snow and polar firn shows that feedback mechanisms exist between microstructure changes and energy and mass transfer coefficients. Differences between the predominant processes in the short polar summer and the winter cause sharp textural discontinuities in the stratigraphic columns at many polar locations. This distinctive layering forms the basis of studies on accumulation rates, layer ages and other investigations pertinent to firn and ice core analysis. Processes forming the stratification of firn are not completely understood, nor are the associated loading patterns of chemical species. Past research on energy and mass transfer in near-surface polar firn is briefly surveyed. Current research focuses on processes controlled by the geometry of the ice and pore phases in the snow and firn. An overview is given of some of this work.

51-190

Effects of snow ventilation on chemical concentrations.

Waddington, E.D., Cunningham, J., Harder, S.L., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.403-451, Refs. p.446-450.

DLC QC879.6.C45 1996

Polar atmospheres, Atmospheric composition, Scavenging, Snow air interface, Snow composition, Snow permeability, Air flow, Firn stratification, Ice cores, Paleoclimatology, Mathematical models, Greenland, Antarctica—Amundsen-Scott Station

In this paper, the authors outline the current theoretical basis for calculating air flow in polar firn. They first review the role of snow ventilation in the capture of aerosols from Gjessing (1977) to the present. They then estimate the transport resistance for windpumping to assess whether windpumping is a rate-limiting factor in aerosol deposition, concluding that a realistic windpumping model of aerosol deposition is necessary to reconstruct paleoclimate conditions from ice core aerosol records. They show that ice core records for reversibly deposited species that have undergone post-depositional changes without achieving equilibrium with the atmosphere prior to deep burial will be difficult to interpret; ventilation is instrumental in helping reversibly deposited species reach equilibrium. Finally, they speculate on the relative importance of ventilation for the concentrations of irreversibly and reversibly deposited species in Greenland and Antarctica now and at the Last Glacial Maximum (LGM), and identify areas of windpumping theory that require further research.

51-191

Wind-blown snow: sublimation, transport and changes to polar snow.

Pomeroy, J.W., Jones, H.G., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.453-489, Refs. p.485-489.

DLC QC879.6.C45 1996

Polar atmospheres, Atmospheric composition, Scavenging, Snow air interface, Snow composition, Snow evaporation, Snow erosion, Wind erosion, Blowing snow, Snowdrifts

Blowing snow is ubiquitous in polar regions and undergoes relatively rapid sublimation whilst in transit. The erosion, transport and deposition of blowing snow dramatically transforms the physical and chemical characteristics of polar snow. Processes active during snow transport are sublimation, thermophoresis, diffusiophoresis, electrophoresis and ventilation; these processes occur at much higher rates than for *in-situ* surface snow. Conditions suitable for photochemistry exist in blowing snow particles, though no strong empirical evidence exists for such reactions in snow. Annual accumulations of snow and ions on polar ice-sheets are a residual of the blowing snow phenomenon and therefore a result of the interaction of wind speed, temperature and snowfall regimes with surface topography and the meteorological history of the snowpack. Chemical transformations in blowing snow involve ion conservation, scavenging, volatilization, resuspension and consumption. Experimental evidence from Canada, Scotland and the Antarctic shows that for moderate blowing snow regimes the first three processes dominate whilst for severe regimes resuspension dominates. (Auth. mod.)

51-192

Turbulent exchange of momentum and scalars in the surface layer over antarctic snow and ice.

Bintanja, R., Van den Broeke, M.R., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.491-515, 31 refs.

DLC QC879.6.C45 1996

Snow air interface, Snow heat flux, Snow evaporation, Snow surface, Blowing snow, Snowdrifts, Snow erosion, Wind erosion, Turbulent exchange, Moisture transfer, Mathematical models, Antarctica—Queen Maud Land

Vertical profiles of wind speed, temperature and humidity were used to estimate the roughness lengths for momentum (z_0), heat (z_H) and moisture (z_Q) over antarctic surfaces. The data were obtained on a blue ice field in Queen Maud Land. The roughness lengths are generally used to compute the fluxes of momentum, heat and moisture from standard meteorological observations using the flux-profile relationships. The value of z_0 is easily evaluated from the wind speed profile. The scalar roughness lengths are evaluated using a new method which circumvents the difficult measurement of the surface temperature. It is found that the vertical exchange processes are strongly influenced by the saltating snow particles close to the surface during snow-drift events. The scalar roughness lengths seem to be approximately equal to z_0 for a large range of roughness Reynolds numbers, despite the frequent occurrence of drifting snow. It is suggested that snow-drift processes are important for the turbulent transport of scalar quantities such as heat and water vapor, and presumably also for the transport of other atmospheric constituents. (Auth.)

51-193

Thermodynamics of the solute layer on the surface of ice.

Brimblecombe, P., Conklin, M.H., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.517-526, 15 refs.

DLC QC879.6.C45 1996

Atmospheric composition, Ice air interface, Ice heat flux, Ice composition, Ice surface, Water films, Vapor transfer

51-194

Gas diffusion in firn.

Schwander, J., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.527-540, 26 refs.

DLC QC879.6.C45 1996

Polar atmospheres, Atmospheric composition, Ice air interface, Ice composition, Ice density, Firn stratification, Ice cores, Vapor diffusion, Bubbles, Paleoclimatology

Different components and properties of the ice deposits on the earth store information on the climate and environment. One can mainly distinguish among three storage types: properties and isotopic composition of the ice itself; solid (and liquid) trace substances in the ice; and gaseous and volatile components. This article reviews some aspects of the transfer of gaseous components from the atmosphere to the ice, including porosity data published for Siple Station. The porosity of the firn decreases gradually from the surface to the depth of firn-ice transition where the pores are pinched off to form isolated air bubbles. Near the snow surface the porosity (defined as the void volume fraction) is about 0.6 to 0.7, corresponding to a density of about 350 kg/m^3. Under cold polar conditions there are only a few bubbles closed off at porosities above 0.15 (density 780 kg/m^3), which is reached about 10 m above the final close-off depth.

51-195

Location, movement and reactions of impurities in solid ice.

Wolff, E.W., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.541-560, Refs. p.558-560.

DLC QC879.6.C45 1996

Polar atmospheres, Marine atmospheres, Atmospheric composition, Ice air interface, Ice composition, Impurities, Firn stratification, Ice cores, Vapor diffusion, Paleoclimatology, Greenland, Antarctica—Dolleman Island

The aim of drilling ice cores is to obtain paleoatmospheric information of wide significance. However, the concentrations of chemicals found in the ice are determined both by the atmospheric concentrations and by depositional and post-depositional processes. There is the possibility that chemical changes can occur, at least to more complex species, over the long timescales that are relevant for ice. Diffusion is bound to take place to some extent, affecting the apparent rate of temporal change inferred from ice core profiles. Discussion of all these factors requires an understanding of the way in which impurities are held in the ice. This paper discusses all these items, concentrating on processes in solid ice, and in firn below the top meter or two. Data from Dolleman I. are included.

51-196

Firn properties affecting gas exchange at Summit, Greenland: ventilation possibilities.

Albert, M.R., Arons, E.M., Davis, R.E., MP 3892, Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.561-565, 13 refs.

DLC QC879.6.C45 1996

Polar atmospheres, Atmospheric composition, Snow air interface, Snow heat flux, Snow composition, Firn stratification, Snow permeability, Air flow, Vapor diffusion, Greenland

The processes by which chemical species in the atmosphere become incorporated in firn depend both upon the nature of the forcing from the atmosphere and upon the properties of the firn itself. These processes include both diffusion and advection (the transport of heat, vapor, and chemical species by air flow within the snow and firn). In this paper the authors present recent field measurements of firn properties relevant to the transport processes, and use simplified model calculations to investigate the possibility of advection at Summit. Advective processes include the result of wind-driven air flow through the snow and firn, also called ventilation or wind-pumping. If present in the firn, the air flow would advect heat, mass, and chemical species through the firn at rates far greater than diffusive processes permit. In a theoretical analysis, Colbeck concluded that surface topography would be the main driver of ventilation, and suggested that the majority of the flow may be within the surface features themselves. In another theoretical analysis, Clarke and Waddington showed that pressure disturbances due to wind turbulence over flat terrain attenuate with depth, depending on both the temporal and spatial frequency content of the pressure signal. Albert and McGilvary showed that the temperature profile resulting from ventilation is controlled by a balance between heat carried by the dry air flow and heat conduction due to boundary temperatures.

51-197

Interactions of gas phase HCl and HNO_3 with ice.

Dominé, F., Thibert, E., Chaix, L., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.567-571, 8 refs.

DLC QC879.6.C45 1996

Polar atmospheres, Atmospheric composition, Snow air interface, Snow composition, Ice composition, Gas inclusions, Greenland

51-198

Climate and atmospheric tracers modelling with GCM, polar applications.

Genthon, C., Armengaud, A., Krinner, G., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.573-579, 6 refs.

DLC QC879.6.C45 1996

Polar atmospheres, Atmospheric circulation, Atmospheric composition, Ice sheets, Ice air interface, Ice composition, Global change, Computerized simulation

The global distribution of atmospheric constituents (whether major or minor species, gas or aerosol, or even energy and momentum) is determined by the distribution of the sources, sinks, and conversion within the atmosphere, and by transport and mixing by the atmospheric circulation. General circulation models (GCMs) simulate on a global scale the transport and mixing of air, heat, moisture and momentum. The development and results of two purely physical (no chemistry involved) tracers/climate models based on existing GCMs are briefly described here, with emphasis on the polar ice sheets, some aspects of the ice-atmosphere transfer function, and model shortcomings. A third model is currently being setup on the basis of a new GCM, the characteristics of which are also presented. Data from antarctic stations are included.

51-199

Atmospheric residence times influence on tracer concentrations in remote polar areas.

Hansson, M., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.581-585, 8 refs.

DLC QC879.6.C45 1996

Polar atmospheres, Atmospheric circulation, Atmospheric composition, Ice sheets, Ice cores, Ice composition, Global change, Paleoclimatology, Greenland

51-200

Behaviour of organic chemicals in snow.

Mackay, D., Jia, C., Hoff, J., Gregor, D., Wania, F., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.587-593, 19 refs.

DLC QC879.6.C45 1996

Atmospheric composition, Scavenging, Snow air interface, Snow composition

51-201

Mass size distributions for atmospheric particulate elements at the Zeppelin background station in Ny Ålesund, Spitsbergen.

Maenhaut, W., Havránek, V., Ducastel, G., Hanssen, J.E., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.595-599, 15 refs.

DLC QC879.6.C45 1996

Polar atmospheres, Atmospheric circulation, Atmospheric composition, Air pollution, Aerosols, Particle size distribution, Norway—Spitsbergen

51-202

Air/snow transfer studies at the high-alpine site Jungfraujoch, Switzerland.

Schwikowski, M., Baltensperger, U., Gäggeler, H., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.601-605, 5 refs.

DLC QC879.6.C45 1996

Snow air interface, Snow crystal nuclei, Snowfall, Scavenging, Snow composition, Switzerland

51-203

On the spatial variability of impurity content and stable isotopic composition in recent Summit snow.

Steffensen, J.P., Clausen, H.B., Christensen, J.M., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.607-615, 8 refs.

DLC QC879.6.C45 1996

Polar atmospheres, Atmospheric composition, Air pollution, Snow air interface, Snow composition, Snow impurities, Isotope analysis, Greenland

51-204

Fluorocarbon tracers of the age of air in alpine firn.

Sturges, W.T., Penkett, S.A., Barnola, J.M., Chappellaz, J.A., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.617-622, 13 refs.

DLC QC879.6.C45 1996

Atmospheric composition, Snow air interface, Snow composition, Firn stratification, Ice dating, Switzerland

51-205

Peroxide record from the DSS ice core, Law Dome, Antarctica: preliminary results.

Van Ommen, T.D., Morgan, V., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.623-627, 11 refs.

DLC QC879.6.C45 1996

Polar atmospheres, Atmospheric composition, Snow air interface, Snow composition, Ice sheets, Firn stratification, Ice cores, Ice dating, Paleoclimatology, Antarctica—Law Dome

The Law Dome site, and in particular the Dome Summit South (DSS) ice core, offer distinct features which may well shed light on the difficult issue of the atmosphere/ice relationship. The DSS site is located 4.6 km SSW of the summit of Law Dome in Wilkes Land. The core was drilled over successive summers from 1988-89 to 1992-93 when drilling reached silty ice near the base of the ice sheet, 1200 m below surface (mbs) and provides a record which extends back in time beyond the last glacial maximum (LGM). The preservation of seasonal cycles in $\delta^{18}O$ and H_2O_2 in the DSS core permits accurate dating by layer counting through most of the Holocene period.

51-206

Where are we going? The ice core-paleoclimate inverse problem.

Waddington, E.D., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.629-640, 13 refs.

DLC QC879.6.C45 1996

Atmospheric composition, Snow air interface, Ice air interface, Snow composition, Ice composition, Ice cores, Drill core analysis, Paleoclimatology, Mathematical models

51-207

Atmospheric ozone—an update.

Bojkov, R.D., *World Meteorological Organization. Bulletin*, Oct. 1990, 39(4), p.246-253.

Polar atmospheres, Atmospheric density, Climatology, Climatic changes, Stratosphere, Ozone, Aerosols, Air pollution, Long range forecasting, Remote sensing

This article addresses questions about global ozone changes, the antarctic ozone 'hole', the role of chlorofluorocarbons and future prospects for the stratospheric ozone layer. It is based on the two most recent international assessments published as WMO Ozone Reports Nos.18 and 20 (1990). (Auth. mod.)

51-208

New road built in Iceland using gabion technique: initial reviews look good.

Avolis, K., *Naval civil engineer*, 1988, 27(4), p.26.

Cold weather construction, Roads, Roadbeds, Soil stabilization, Earth fills, Latticed structures, Synthetic materials, Foundations, Iceland

51-209

Geodesic dome in Antarctica threatened by snow movement.

Thomas, J., *Naval civil engineer*, 1988, 28(1), p.13-14.

Buildings, Latticed structures, Stability, Deformation, Settlement (structural), Glacier flow, Ice creep, Ice solid interface, Antarctica—McMurdo Station

Instability of a geodesic structure due to ice creep at McMurdo Station and related engineering operations are briefly described.

51-210

Studies of the marginal ice zone along the East Greenland coast.

Bourke, R.H., Paquette, R.G., *Naval research reviews*, 1987, 39(1), p.19-27, 11 refs.

Oceanography, Ice shelves, Sea ice distribution, Ice edge, Ocean currents, Ice water interface, Water transport, Water temperature, Hydrography, Greenland

51-211

NPS meteorology studies on the marginal ice zone.

Davidson, K.L., Guest, P.S., *Naval research reviews*, 1987, 39(1), p.28-35, 21 refs.

Oceanography, Marine atmospheres, Marine meteorology, Synoptic meteorology, Turbulent boundary layer, Sounding, Microclimatology, Air ice water interaction, Surface roughness, Ice edge, Wind factors, Greenland

51-212

Arctic lows.

Twitchell, P.F., *Naval research reviews*, 1987, 39(4), p.15-22, 17 refs.

Marine meteorology, Storms, Polar atmospheres, Cloud cover, Turbulent boundary layer, Fronts (meteorology), Atmospheric disturbances, Air ice water interaction, Wind velocity, Simulation, Weather forecasting

51-213

Late Palaeozoic glaciation.

Dickins, J.M., *BMR journal of Australian geology & geophysics,* June 1984, 9(2), p.163-169, 77 refs.

Pleistocene, Paleoclimatology, Glaciation, Glacial geology, Glacier oscillation, Moraines, Glacial deposits, Sedimentation, Geochronology, Sampling, Ice age theory

51-214

Arctic science submarine project—the past, the present and the future.

Newton, G.B., DeLaca, T.E., Marine Technology Society Conference. Washington, D.C., Sep. 7-9, 1994. Proceedings. Challenges and opportunities in the marine environment, Marine Technology Society, 1994, p.134-140, 13 refs.

DLC GC2.M78

Oceanographic surveys, Ice surveys, Climatology, Research projects, Submarines, Nuclear power, Military research, Exploration, Arctic Ocean

51-215

Using forward-looking airborne radar in the International Ice Patrol mission.

Trivers, G.A., Murphy, D.L., Marine Technology Society Conference. Washington, D.C., Sep. 7-9, 1994. Proceedings. Challenges and opportunities in the marine environment, Marine Technology Society, 1994, p.479-483, 6 refs.

DLC GC2.M78

Sea ice distribution, Oceanography, Ice surveys, Icebergs, Ice detection, Radar tracking, Side looking radar, Ice reporting, Airborne radar, Performance, Arctic Ocean

51-216

Oceanographic research ships of the twenty-first century.

Rolland, D., Demas, T., Marine Technology Society Conference. Washington, D.C., Sep. 7-9, 1994. Proceedings. Challenges and opportunities in the marine environment, Marine Technology Society, 1994, p.556-562, 7 refs.

DLC GC2.M78

Oceanography, Exploration, Icebreakers, Design criteria, Research projects

The United States Navy is currently involved in several construction programs to provide new research ships for use by the Government and by universities. In the course of designing, constructing, and operating these ships, insight has been gained in the needs, methods, and problems of modern oceanographers. Lessons learned from these programs are applied every day and will be indispensable in developing research ships of the future. This paper explores the successes and failures of these new oceanographic ship designs with an eye toward designing oceanographic ships for polar operations in the twenty-first century. (Auth. mod.)

51-217

Investigation of the interaction between variations in atmospheric thermal tides and anomalous ozone concentration.

Gavrilov, A.A., Kaidalov, O.V., *Advances in space research,* June 1996, 17(11), p.(11)157-(11)160, 8 refs.

Ozone, Stratosphere, Air temperature, Ultraviolet radiation, Atmospheric composition, Diurnal variations, Mathematical models

This paper discusses the variations of atmospheric semidiurnal tidal parameters caused by global ozone anomalies of the antarctic ozone hole type, and establishes some regularities of their evolution. Analysis of preliminary data showed that the anomalous decrease of ozone in Oct. at high latitudes of the Southern Hemisphere results in a simultaneous abrupt drop of the semidiurnal tidal amplitude values at high latitudes of the lower thermosphere in the Northern Hemisphere. Inasmuch as such an abrupt decrease of amplitude values in the lower thermosphere in Oct. has been observed from experimental data since 1952, it is hypothesized that the antarctic ozone hole appeared at least not later than this time period. (Auth. mod.)

51-218

Mechanism of middle-scale ice movements due to convective flows. [Mekhanizm mezomasshtabnykh dvizheniĭ l'da vsledstvie konvektivnykh techeniĭ]

Gol'dshteĭn, R.V., Osipenko, N.M., *Rossiĭskaia Akademiia Nauk. Doklady Akademii Nauk,* Oct. 1995, 344(4), p.481-484, In Russian. 14 refs.

Ice surveys, Sea ice, Ice mechanics, Convection, Thermal properties, Flow rate, Ice models, Ice cover thickness

51-219

Our changing atmosphere.

Crutzen, P.J., ed, Gerard, J.C., ed, Zander, R., ed, Liège International Astrophysical Colloquium, 28th, June 26-30, 1989, Liège, Université de Liège, Institut d'Astrophysique, 1989, 534p., Refs. passim. For selected papers see 51-220 through 51-227 or I-55846 through I-55852 and J-55853.

DLC QC851.L44 1989

Ozone, Stratosphere, Atmospheric composition, Infrared spectroscopy, Meteorological instruments, Aerosols, Paleoclimatology

The 28th Liège Astrophysical Colloquium was devoted to chemical composition and radiative changes which have affected the Earth's atmosphere on a time scale of decades and centuries. The choice of this topic reflected not only the interest for a field of growing scientific, economic and sociological importance but also the wish to focus attention on the various observational and modeling programs presently carried out at the Institut d'Astrophysique de Liège in connection with these questions. Two current key issues have focused the world's attention on this field: the ozone depletion observed in the antarctic region, and the global warming associated with the enhanced greenhouse heating of the surface. Consequently, a substantial fraction of the presentations were devoted to these themes.

51-220

Recent results from analysis of high resolution infrared balloon-borne ground-based and laboratory spectra.

Goldman, A., et al, Liège International Astrophysical Colloquium, 28th, June 26-30, 1989. Proceedings. Our changing atmosphere, edited by P.J. Crutzen, J.C. Gerard, and R. Zander, Liège, Université de Liège, Institut d'Astrophysique, 1989, p.99-105, 7 refs.

DLC QC851.L44 1989

Ozone, Infrared spectroscopy, Stratosphere, Atmospheric composition, Antarctica—Amundsen-Scott Station

A high resolution Michelson type interferometer system has been used to obtain infrared solar absorption spectra of the stratosphere during several recent balloon flights, as well as ground-based and laboratory spectra of molecules of stratospheric interest. The stratospheric spectra show numerous new spectral features of several important atmospheric trace gases such as O_3 (and isotopes), NO_2, HNO_3, $ClONO_2$, HNO_4, COF_2 and others in the 5-12 μm spectral region. Analysis of the new features shows that much of the available spectroscopic line parameters are inadequate, and new theoretical and laboratory studies are in progress, leading to more complete identification and quantification of stratospheric gases. Ground-based spectra in the 3-12 μm region, mostly at 0.02/cm resolution, have been obtained from several geographical locations such as Amundsen-Scott Station, New Zealand, Mauna Loa (Hawaii) and Colorado. These spectra and previous balloon-borne spectra at 0.02/cm resolution have provided quantification of several trace gases since 1980. (Auth.)

51-221

Stratospheric ozone and nitrogen dioxide monitoring at southern and northern polar latitudes.

Pommereau, J.P., Goutail, F., LeTexier, H., Jorgensen, T.S., Liège International Astrophysical Colloquium, 28th, June 26-30, 1989. Proceedings. Our changing atmosphere, edited by P.J. Crutzen, J.C. Gerard, and R. Zander, Liège, Université de Liège, Institut d'Astrophysique, 1989, p.141-147, 2 refs.

DLC QC851.L44 1989

Ozone, Stratosphere, Atmospheric composition, Meteorological instruments, Antarctica—Dumont d'Urville Station

Ground-based spectrometers for long-term stratospheric monitoring have been installed permanently at the polar circle in both the Arctic and the Antarctic. Ozone and nitrogen dioxide columns are measured twice a day, morning and evening, at 90° solar zenith angle, regardless of the cloud cover. A comparison to simultaneous ozone observations from orbit by the TOMS experiment (Total Ozone Mapping Spectrometer) on board the satellite Nimbus 7 shows very good agreement between the two measurements at a time scale of a few days, but a shift of up to 30% in winter, the ground-based columns being larger than the satellite ones. Nitrogen dioxide columns display a significant seasonal variation, minimum in winter and maximum in summer; the diurnal variations are highest in spring and fall. The evening ozone column is found to be systematically reduced compared to that of the morning, by up to 5 to 7%. This is believed to be direct evidence of the occurrence of ozone destruction. (Auth. mod.)

51-222

Global ozone evolution.

Stolarski, R.S., Liège International Astrophysical Colloquium, 28th, June 26-30, 1989. Proceedings. Our changing atmosphere, edited by P.J. Crutzen, J.C. Gerard, and R. Zander, Liège, Université de Liège, Institut d'Astrophysique, 1989, p.163-170, 13 refs.

DLC QC851.L44 1989

Ozone, Atmospheric composition, Stratosphere, Global change

Global ozone evolution naturally divides itself into 3 problems; the Antarctic, the Arctic, and the rest of the globe. The antarctic springtime decrease since the mid 1970s is as much as 50% in the column amount and 90% in the local concentration, between 14 and 22 km altitude. The accepted primary cause is the increasing amount of chlorine in the stratosphere resulting from fluorocarbon release combined with the perturbing influence of polar stratospheric clouds in the Antarctic. A year-to-year variation occurs in the springtime decrease which appears to be associated with the quasi-biennial oscillation. Ozone in the Arctic behaves quite differently because of the greater activity of planetary wave disturbances and subsequent early breakdown of the polar vortex. Trend studies of total ozone at high northern latitudes have shown larger than expected negative changes and measurements have recently demonstrated perturbed chlorine chemistry in the north polar vortex. It is a reasonable speculation, but not proven, that the larger than expected north polar ozone decline is related to the existence of polar stratospheric clouds and perturbed chlorine chemistry. (Auth. mod.)

51-223

Possible influence of long-term SST-anomalies on the eddy ozone transport.

Jadin, E.A., Liège International Astrophysical Colloquium, 28th, June 26-30, 1989. Proceedings. Our changing atmosphere, edited by P.J. Crutzen, J.C. Gerard, and R. Zander, Liège, Université de Liège, Institut d'Astrophysique, 1989, p.195-203, 15 refs.

DLC QC851.L44 1989

Ozone, Stratosphere, Air temperature, Ocean currents, Atmospheric composition, Seasonal variations, Antarctica—Halley Station, Antarctica—Amundsen-Scott Station, Antarctica—Showa Station

An analysis of the experimental data of ozone variability over Halley, Showa and Amundsen-Scott stations in Aug.-Nov. 1987 showed that the ozone decrease over the South Pole began in the end of Aug. during the antarctic polar night. It is suggested that the ozone increase in 1988 could be connected with quasi-biennial oscillations (QBO). The simple mechanism of the ozone and temperature QBO in high latitudes is discussed: this mechanism is based on the idea of the planetary wave reflection from zero wind line near the equator. Using the planetary wave model, the influence of sea-surface temperature (SST) variations on the eddy ozone coefficients is calculated. Results point qualitatively to the possible connection between supposed long-term changes in geographical positions of the world ocean's warm streams and observed interannual ozone anomalies in the atmosphere. (Auth. mod.)

51-224

Global change in aerosols and PSCs.

McCormick, M.P., Liège International Astrophysical Colloquium, 28th, June 26-30, 1989. Proceedings. Our changing atmosphere, edited by P.J. Crutzen, J.C. Gerard, and R. Zander, Liège, Université de Liège, Institut d'Astrophysique, 1989, p.219-235, 16 refs.

DLC QC851.L44 1989

Aerosols, Spaceborne photography, Meteorological instruments, Stratosphere, Solar radiation, Clouds (meteorology), Ozone, Atmospheric composition, Global change, Data processing

A long-term record of global stratospheric aerosols and PSCs is evolving from the SAM II and SAGE series of satellite instruments. In addition, lidar data and balloon-borne *in situ* data taken at various locations complement these aerosol data sets. Aerosols produced by volcanic eruptions have dominated the stratospheric aerosol loading over the last decade, with the Apr. 1982 eruption of El Chichon in Mexico causing the largest perturbation in the Northern Hemisphere during this century. The stratospheric aerosol loading has been decreasing since, with the Nov. 1985 eruption of Ruiz interrupting this decay. Aerosol loading in 1989 has not yet returned to the 1979 levels. Polar stratospheric clouds occur in wintertime at temperatures <200K in both polar regions. These clouds are a necessary ingredient in the production of the antarctic ozone hole due to heterogeneous chemistry and appear to be in phase with the westerly phase of the QBO. (Auth.)

51-225

Astronomical forcing of the last glacial-interglacial cycle.

Berger, A., Fichefet, T., Gallée, H., Tricot, C., Marsiat, I., Van Ypersele, J.P., Liège International Astrophysical Colloquium, 28th, June 26-30, 1989. Proceedings. Our changing atmosphere, edited by P.J. Crutzen, J.C. Gerard, and R. Zander, Liège, Université de Liège, Institut d'Astrophysique, 1989, p.353-382, Refs. p.375-382.

DLC QC851.L44 1989

Paleoclimatology, Models, Climatic changes, Air ice water interaction, Ice volume, Oceanography

A zonal-sectorially averaged seasonal model has been developed for simulating the transient response of the climate system to astronomical forcing. The atmosphere is represented by a zonally averaged quasigeostrophic model which includes accurate treatment of radiative transfer. The atmospheric model interacts with the other components of the climate system (ocean, sea ice and land surface covered or not by snow and ice) through vertical fluxes of momentum, heat and water vapor. The model explicitly incorporates surface energy balances and has snow and sea-ice mass budgets. The vertical profile of the upper-ocean temperature is computed by an interactive mixed-layer model which takes into account the meridional convergence of heat. (Auth. mod.)

51-226

Interactions between greenhouse gases and climate over the last climatic cycle, as deduced from the Vostok ice core record.

Raynaud, D., Jouzel, J., Barnola, J.M., Chappellaz, J., Liège International Astrophysical Colloquium, 28th, June 26-30, 1989. Proceedings. Our changing atmosphere, edited by P.J. Crutzen, J.C. Gerard, and R. Zander, Liège, Université de Liège, Institut d'Astrophysique, 1989, p.385-401, Refs. p.397-400.

DLC QC851.L44 1989

Ice cores, Climatic changes, Atmospheric composition, Climatic factors, Air temperature, Paleoclimatology, Air pollution, Antarctica—Vostok Station

The 2 km-long ice core recovered at Vostok Station provides a unique record of different changes in atmospheric composition over the last climatic cycle (approximately the past 150,000 years). In particular the record includes changes in radiatively active gases (CO_2, CH_4). An effort is being made to evaluate the climatic contribution of the observed changes in these greenhouse gases. The role of climatically-induced changes in the biospheric and oceanic reservoirs as forcing these changes is discussed. (Auth.)

51-227

Carbonyl sulfide concentrations in the surface waters and above the Indian Ocean.

Mihalopoulos, N., Nguyen, B.C., Belviso, S., Liège International Astrophysical Colloquium, 28th, June 26-30, 1989. Proceedings. Our changing atmosphere, edited by P.J. Crutzen, J.C. Gerard, and R. Zander, Liège, Université de Liège, Institut d'Astrophysique, 1989, p.477-486, 13 refs.

DLC QC851.L44 1989

Oceanography, Sea water, Chemical analysis, Water pollution, Atmospheric composition, Air pollution, —Indian Ocean

During two oceanographic cruises in Apr.-May 1986 and July 1987, the authors measured COS concentrations in surface seawater and in the marine atmospheric boundary layer in the Indian Ocean (East African coastal areas, Amsterdam I., the Somali upwelling area and open ocean). The results show that surface waters of the Indian Ocean are supersaturated with respect to the atmosphere. Taking into account the seasonal and geographical variations of the supersaturation factor, a global oceanic flux of 0.32 Tg COS is estimated. (Auth.)

51-228

Avalanche course manual.

Canadian Avalanche Association Training Schools (CAATS), Revelstoke, British Columbia, Aug. 1996, Var. p., 35 refs.

Snow cover stability, Avalanche forecasting, Avalanche formation, Avalanche tracks, Safety, Rescue operations, Manuals, Canada

51-229

Ice and flood.

Starosolszky, Ö., Defence from floods and floodplain management. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series E. Applied sciences. Vol.299, Dordrecht, Netherlands, Kluwer Academic Publishers, 1995, p.193-210, 12 refs. Presented at a NATO advanced study institute held in Budapest, Apr. 26-May 7, 1994.

DLC TC530.D397 1995

River ice, Ice forecasting, Freezeup, Ice breakup, Ice jams, Ice cover effect, Ice water interface, River flow, Ice control, Flood control

51-230

Pollution of the arctic atmosphere.

Sturges, W.T., ed, Environmental management series, London, Elsevier Science Publishers Ltd., 1991, 334p., Refs. passim. For individual papers see 51-231 through 51-240.

DLC TD883.7.A68P65 1991

Polar atmospheres, Atmospheric circulation, Atmospheric composition, Air pollution, Aerosols, Haze, Human factors, Environmental impact

51-231

Understanding the Arctic: research policies and responsibilities.

Roederer, J.G., Pollution of the arctic atmosphere. Edited by W.T. Sturges, London, Elsevier Science Publishers Ltd., 1991, p.1-11, 15 refs.

DLC TD883.7.A68P65 1991

Air pollution, Water pollution, Environmental impact, Environmental protection, Research projects, International cooperation, Regional planning

51-232

Climatology and meteorology of arctic air pollution.

Raatz, W.E., Pollution of the arctic atmosphere. Edited by W.T. Sturges, London, Elsevier Science Publishers Ltd., 1991, p.13-42, 93 refs.

DLC TD883.7.A68P65 1991

Polar atmospheres, Atmospheric circulation, Atmospheric composition, Air pollution, Haze

51-233

Arctic air pollution as reflected in snowpits and ice cores.

Davidson, C.I., Jaffrezo, J.L., Mayewski, P.A., Pollution of the arctic atmosphere. Edited by W.T. Sturges, London, Elsevier Science Publishers Ltd., 1991, p.43-95, 110 refs.

DLC TD883.7.A68P65 1991

Polar atmospheres, Atmospheric circulation, Atmospheric composition, Air pollution, Scavenging, Snow composition, Snow impurities, Ice sheets, Ice cores, Ice composition, Greenland

51-234

Chemical tracers of the origins of arctic air pollution.

Pacyna, J.M., Pollution of the arctic atmosphere. Edited by W.T. Sturges, London, Elsevier Science Publishers Ltd., 1991, p.97-122, 62 refs.

DLC TD883.7.A68P65 1991

Polar atmospheres, Atmospheric circulation, Atmospheric composition, Air pollution, Haze, Aerosols, Human factors, Environmental impact

51-235

Physical properties and physical chemistry of arctic aerosols.

Shaw, G.E., Pollution of the arctic atmosphere. Edited by W.T. Sturges, London, Elsevier Science Publishers Ltd., 1991, p.123-154, 45 refs.

DLC TD883.7.A68P65 1991

Polar atmospheres, Atmospheric density, Atmospheric physics, Atmospheric composition, Air masses, Air pollution, Aerosols, Haze

51-236

Sulphur and nitrogen pollution in the arctic atmosphere.

Barrie, L.A., Bottenheim, J.W., Pollution of the arctic atmosphere. Edited by W.T. Sturges, London, Elsevier Science Publishers Ltd., 1991, p.155-183, 49 refs.

DLC TD883.7.A68P65 1991

Polar atmospheres, Atmospheric circulation, Atmospheric composition, Air pollution, Photochemical reactions, Human factors, Environmental impact

51-237

Arctic ozone chemistry.

Oltmans, S.J., Pollution of the arctic atmosphere. Edited by W.T. Sturges, London, Elsevier Science Publishers Ltd., 1991, p.185-215, 68 refs.

DLC TD883.7.A68P65 1991

Polar atmospheres, Atmospheric circulation, Atmospheric composition, Polar stratospheric clouds, Air pollution, Ozone

51-238

Trace organic chemicals in the arctic environment: atmospheric transport and deposition.

Gregor, D.J., Pollution of the arctic atmosphere. Edited by W.T. Sturges, London, Elsevier Science Publishers Ltd., 1991, p.217-254, 93 refs.

DLC TD883.7.A68P65 1991

Polar atmospheres, Atmospheric circulation, Atmospheric composition, Air pollution, Scavenging, Snow impurities, Nutrient cycle, Human factors, Environmental impact, Physiological effects

51-239

Local sources of pollution in the Arctic: from Prudhoe Bay to the Taz Peninsula.

Jaffe, D.A., Pollution of the arctic atmosphere. Edited by W.T. Sturges, London, Elsevier Science Publishers Ltd., 1991, p.255-287, 42 refs.

DLC TD883.7.A68P65 1991

Polar atmospheres, Atmospheric circulation, Atmospheric composition, Air pollution, Human factors, Environmental impact

51-240

Potential climate change from arctic aerosol pollution.

Blanchet, J.P., Pollution of the arctic atmosphere. Edited by W.T. Sturges, London, Elsevier Science Publishers Ltd., 1991, p.289-322, 53 refs.

DLC TD883.7.A68P65 1991

Polar atmospheres, Atmospheric circulation, Atmospheric composition, Air pollution, Aerosols, Haze, Air ice water interaction, Ice cover effect, Radiation balance, Global warming

51-241

Thermokarst-lake-basin sediments, Tuktoyaktuk Coastlands, western arctic Canada.

Murton, J.B., *Sedimentology,* Aug. 1996, 43(3), p.737-760, Refs. p.757-760.

Thermokarst lakes, Thermokarst development, Permafrost transformation, Permafrost structure, Lacustrine deposits, Stratigraphy, Thaw weakening, Subsidence, Sedimentation, Periglacial processes, Geomorphology, Canada—Northwest Territories—Tuktoyaktuk

51-242

One-dimensional problems of frozen soil thawing due to solution seepage.

Egorov, A.G., Kosterin, A.V., Sheshukov, A.E., *Fluid dynamics,* Sep.-Oct. 1995, 30(5), p.767-776, Translated from Rossiiskaia Akademiia nauk. Izvestiia. Mekhanika zhidkosti i gaza. 5 refs.

Geocryology, Ground thawing, Frozen ground temperature, Frozen ground thermodynamics, Brines, Seepage, Ice water interface, Ice melting, Solutions, Phase transformations, Mathematical models

51-243

Effects of pollutants in snowmelt on *Kiaeria starkei*, a characteristic species of late snowbed bryophyte dominated vegetation.

Woolgrove, C.E., Woodin, S.J., *New phytologist,* July 1996, 133(3), p.519-529, 62 refs.

Plant physiology, Ecosystems, Mosses, Snowmelt, Snow impurities, Meltwater, Air pollution, Aerosols, Damage, Ion diffusion, Snow air interface, Environmental tests, Simulation

51-244

Geochemistry in an area recently uncovered from the Filchner Ice Shelf.

Holby, O., Anderson, L.G., *Continental shelf research,* Sep. 1996, 16(11), p.1479-1488, 23 refs.

Oceanography, Bottom sediment, Geochemistry, Ion diffusion, Organic nuclei, Ice shelves, Ice cover effect, Sedimentation, Sampling, Drill core analysis, Antarctica—Filchner Ice Shelf

Sediments were studied in the southern Weddell Sea that had been both covered by the ice shelf prior to 1986 (ICS) and outside the ice shelf. The composition of particulate matter in these sediments shows that the sedimentation under the ice shelf is quantitatively similar to that outside the ice shelf, except that the former has a negligible content of easily degradable organic matter, indicating a very low biochemical activity. The ^{210}Pb profile from the ICS station gave a sedimentation rate of 0.02 cm/y. This accumulation rate, combined with a particulate carbon content of approximately 1%, yields an annual net accumulation of 1.7 g C/m^2. The profiles of nutrients in the interstitial water (under the ice shelf) indicate a very small flux to the overlaying water. Outside the ice shelf the flux is significantly higher, though still small. (Auth. mod.)

51-245

High speed rotary snowblower code E55.

Caird, J.C., Canada. Royal Canadian Air Force. Air Materiel Command. Central Experimental and Proving Establishment. Report No.1367, Ottawa, 1959, 20p. + appends., AD-225 899.

Snow removal equipment, Design, Cold weather performance, Cold weather tests, Modification

51-246

Casey Airfield project report, summer 89/90.

Sheers, R., [1990], 12p., Unpublished MS. Covers work done during the southern summer 1989-1990.

Airports, Ice runways, Construction equipment, Antarctica—Casey Station

During the first half of 1989 the Antarctic Division initiated an airfield project that culminated in the construction of an ice-snow runway with ancillary facilities. The objective was to prove the feasibility of operating heavy wheeled transport aircraft (C-130) to and from an area near Casey Station. Due to a combination of factors, to be highlighted in this report, the runway was not completed and scheduled trial flights did not take place. The aim of this report is to give a broad outline of the project, highlight difficulties encountered and to comment on the feasibility of the concept. This report is not intended to provide specific snow/ice engineering and scientific data relating to runway pavement construction. Such information is provided in other reports.

51-247

Explanatory text of geological map of the northern Yamato Mountains, Antarctica. (2) Mt.Torimai.

Motoyoshi, Y., Shiraishi, K., Asami, M., Japanese Antarctic Research Expedition. Antarctic Geological Map Series. Sheet 27, Tokyo, National Institute of Polar Research, 1995, 8p. + 6 plates, 24 refs.

Geology, Mineralogy, Geochemistry, Lithology, Maps, Antarctica—Queen Fabiola Mountains

The text accompanies a map scaled at 1:25,000 of the Yamato Group (Queen Fabiola Mountains), featuring Mt. Torimai. The map is approximately 30" x 42" in size and is color-coded to show areas of moraine and various mineral deposits, rock forms, and geochemical features. The text provides a brief review of prior JARE explorations, describes the general geology of the region, and identifies various structural and the lithological components which predominate.

51-248

Energies and latent heats of water in plant tissue interfaces for analysis of freeze stress.

Olien, C.R., *Thermochimica acta,* July 25, 1996, 284(1), North American Thermal Analysis Society Conference, 24th, San Francisco, CA, Sep. 10-13, 1995. Collected papers. Advances in international thermal sciences: polymers, inorganics, biological materials and techniques, p.127-134, 11 refs.

Plant physiology, Plant tissues, Phase transformations, Cold stress, Freezing points, Damage, Ice adhesion, Ice crystal growth, Latent heat, Ice water interface, Molecular energy levels, Thermodynamic properties, Statistical analysis

51-249

Observation of multiple glass transitions in the system water/1,3-butanediol. Effect on ice crystallization.

Mehl, P.M., *Thermochimica acta,* July 25, 1996, 284(1), North American Thermal Analysis Society Conference, 24th, San Francisco, CA, Sep. 10-13, 1995. Collected papers. Advances in international thermal sciences: polymers, inorganics, biological materials and techniques, p.191-212, 44 refs.

Frozen liquids, Phase transformations, Hydrocarbons, Solutions, Heterogeneous nucleation, Ice crystal growth, Vitreous ice, Ice water interface, Thermodynamic properties, Enthalpy, Temperature measurement, Thermal analysis

51-250

Physical measurements of sea ice.

Brown, J.H., Howick, E.E., *U.S. Navy Electronics Laboratory, San Diego, CA. NEL research and development report,* Feb. 1958, No.825, 23p., 16 refs.

Ice cover strength, Ice elasticity, Ice breaking, Ice acoustics, Ice electrical properties, Ice density, Ice salinity, Ice heat flux, Elastic waves, Bering Sea

51-251

Impact of the Kanzertal avalanche into the Streimbach week storage. [Einstoss der Kanzertallawine in den Wochenspeicher Streimbach]

Huber, A., Internationales Symposion. Interpraevent 1966, Garmisch-Partenkirchen, Germany. Tagungspublikation, Vol.2, Munich, Bayerisches Landesamt für Wasserwirtschaft, 1996, p.81-90, In German with English summary and captions.

Avalanche modeling, Avalanche mechanics, Avalanche forecasting, Reservoirs, Water waves, Flood forecasting, Austria

51-252

To what extent is the city of Biel endangered by the river Schüss and which consequences should be drawn therefrom. [Wie gross ist die Gefährdung der Stadt Biel durch die Schüss und welche Konsequenzen sind daraus zu ziehen]

Horat, P., Naef, F., Internationales Symposion. Interpraevent 1966, Garmisch-Partenkirchen, Germany. Tagungspublikation, Vol.3, Munich, Bayerisches Landesamt für Wasserwirtschaft, 1996, p.195-204, In German with English summary and captions.

Snow hydrology, Snowmelt, Rain, River flow, Stream flow, Runoff forecasting, Flood forecasting, Switzerland

51-253

Early recognition and analysis of glacier hazards in the area of Gruben, Wallis, Swiss Alps. [Früherkennung und Analyse glazialer Naturgefahren im Gebiet Gruben, Wallis, Schweizer Alpen]

Kääb, A., Haeberli, W., Internationales Symposion. Interpraevent 1966, Garmisch-Partenkirchen, Germany. Tagungspublikation, Vol.4, Munich, Bayerisches Landesamt für Wasserwirtschaft, 1996, p.113-122, In German with English summary. 11 refs.

Rock glaciers, Glacier surveys, Glacial hydrology, Glacial lakes, Thermokarst lakes, Lake bursts, Flood forecasting, Switzerland

51-254

Geophysical investigation to determine the structure and stability of a moraine dam at Gruben glacier (Wallis). [Geophysikalische Untersuchungen zur Struktur und Stabilität eines Moränendammes am Grubengletscher (Wallis)]

Vonder Mühll, D., Haeberli, W., Klingelé, E., Internationales Symposion. Interpraevent 1966, Garmisch-Partenkirchen, Germany. Tagungspublikation, Vol.4, Munich, Bayerisches Landesamt für Wasserwirtschaft, 1996, p.123-132, In German with English summary. 5 refs.

Geophysical surveys, Seismic surveys, Slope stability, Moraines, Glacial lakes, Lake bursts, Mudflows, Flood forecasting, Switzerland

51-255

Integral solutions for ice formation and melting outward of the external wall of a pipe with internal and external convection.

Neto, J.H.M., Krarti, M., Intersociety Energy Conversion Engineering Conference (IECEC), 30th, Orlando, FL, July 30-Aug. 4, 1995. Proceedings. Vol.2, New York, American Society of Mechanical Engineers, 1995, p.243-248, 9 refs.

DLC TK2896.I55a 1995 Sci RR

Pipes (tubes), Ice formation, Ice melting, Ice solid interface, Ice water interface, Ice refrigeration, Freezing front, Phase transformations, Heat transfer, Convection, Mathematical models

51-256

Breakage of floating ice by compressed gas blasting.

Mellor, M., Kovacs, A., MP 3893, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, July 1971, 50p., 12 refs. For another version see 27-2529.

Ice breaking, Ice blasting, Ice navigation, Explosives

51-257

Thermal performance of an unattended seismological observatory near Fairbanks, Alaska.

Berg, R., MP 3894, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, Feb. 1970, 106p., 6 refs.

Seismic surveys, Borehole instruments, Permafrost beneath structures, Thaw depth, Frost protection, Cold weather performance, United States—Alaska—Fairbanks

51-258

Intrusion-detection sensors in a cold environment, Loring AFB test site, March-June 1971.

Stevens, H.W., Bates, R.E., Ricard, J., MP 3895, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, Aug. 1971, 131p.

Military facilities, Detection, Sensors, Warning systems, Cold weather tests, United States—Maine

51-259

Freeze-up and break-up data for selected Canadian stations: 1961-1990 normals.

Cote, P.W., Environment Canada. Report 4-91, Ottawa, Aug. 1992, 48p.

Climatology, River ice, Lake ice, Ice cover thickness, Ice reporting, Ice forecasting, Ice navigation, Freezeup, Ice breakup, Seasonal freeze thaw, Statistical analysis, Records (extremes), Canada

51-260

On the mesoscale interaction of lead ice and floes.

Hopkins, M.A., MP 3896, *Journal of geophysical research,* Aug. 15, 1996, 101(C8), p.18,315-18,326, 16 refs.

Oceanography, Sea ice distribution, Ice cover thickness, Pack ice, Ice openings, Drift, Ice mechanics, Ice deformation, Plastic deformation, Pressure ridges, Stress concentration, Computerized simulation, Ice models, Mathematical models

This paper constructs a mesoscale (10-100 km) granular model of the central arctic ice pack. The mesoscale model is based on a dynamic particle simulation in which individual multiyear ice floes and surrounding parcels of first-year ice are explicitly modeled as discrete, convex polygons in a two-dimensional domain. The paper focuses on the results of numerical experiments performed with the mesoscale model. In the experiments the model ice pack is biaxially deformed at constant strain rates. The principal strain rates are varied to create deformation states ranging from pure shear to uniform compression. The results define the shape and magnitude of the

plastic yield surface, the strain rate vectors associated with points on the yield surface, the partition of energy dissipation between ridging and in-plane sliding, and the changes in the ice thickness distribution associated with various deformation states. (Auth. mod.)

51-261

Summary of measurements of ice nucleus concentrations.
Bigg, E.K., *Bulletin de l'observatoire du puy de dôme,* 1960, No.3, p.89-98, With French summary. 22 refs.
Climatology, Atmospheric composition, Aerosols, Ice nuclei, Freezing nuclei, Artificial nucleation, Ice vapor interface, Ice crystal growth, Heterogeneous nucleation, Simulation, Temperature effects, Statistical analysis

51-262

Adsorbate-induced partial ordering of the irregular surface and subsurface of crystalline ice.
Delzeit, L., Devlin, M.S., Rowland, B., Devlin, J.P., Buch, V., *Journal of physical chemistry,* 1996, 100(24), p.10,076-10,082, 14 refs.
Ice physics, Ice crystal structure, Molecular structure, Surface structure, Adsorption, Defects, Deuterium oxide ice, Ice spectroscopy, Infrared spectroscopy, Spectra, Ice vapor interface, Thermodynamic properties

51-263

Sea ice morphology.
Wadhams, P., Advanced Study Institute on the Physics of Ice Covered Seas, Savonlinna, Finland, June 6-17, 1994. Selected papers, Savonlinna, 1994, 46p. + figs., Refs. p.36-43.
Sea ice distribution, Ice cover thickness, Ice physics, Physical properties, Statistical analysis, Air ice water interaction, Climatic changes, Fractals, Ice deformation
This lecture reviews the current state of knowledge of the statistical properties of sea ice morphology, and of sea ice thickness variability in the Arctic and Antarctic. The authors examine to what extent measurements made to date provide evidence for the impact of climate change. (Auth. mod.)

51-264

Atmosphere/sea ice interaction in global climate models: a review.
Nagurnyĭ, A.P., Advanced Study Institute on the Physics of Ice Covered Seas, Savonlinna, Finland, June 6-17, 1994. Selected papers, Savonlinna, 1994, 31p. + appends., 76 refs.
Climatology, Global change, Sea ice distribution, Air ice water interaction, Heat transfer, Ice cover effect, Snow cover effect, Albedo, Climatic factors, Mathematical models, Ice models
This paper models the climatic system, and contains well formalized models of the oceans and sea ice. A further development of the models of the system atmosphere-ocean-ice can be related to the improvement of the parameterization of snow and sea ice cover. A way has been found to create so-called interactive models in the framework of which the models of the evolution of sea and continental ice are realized in great detail, for example, of three-dimensional models of sea ice and snow cover. (Auth. mod.)

51-265

Physical controls on the development and characteristics of antarctic sea ice biological communities—a review and synthesis.
Ackley, S.F., Sullivan, C.W., MP 3897, Advanced Study Institute on the Physics of Ice Covered Seas, Savonlinna, Finland, June 6-17, 1994. Selected papers, Savonlinna, 1994, 24p. + figs., Refs. p.16-23. For another version see 49-1792 or 23J-51832.
Marine biology, Ecosystems, Pack ice, Frazil ice, Ice microstructure, Biomass, Algae, Seasonal variations, Snow cover effect
Ice structures found in antarctic sea ice and related morphological processes are summarized, including: frazil ice growth; the flooded snow layer; pressure ridge induced flooding; thermally driven brine drainage; and platelet-ice formation. The associated colonization, physiological adaptation and growth of sea ice biota within these structures, to the levels presently identifiable, also are reviewed. A strong interaction exists between the physical processes that form, evolve and deteriorate sea ice and the biological communities located within it. Variability of ice structure and associated biological communities over small spatial scales necessitated analysis of the biological component in combination with physical and chemical properties of the sea ice. The ice microstructure provides indications of the growth and evolution of the ice properties and initially defines how ice biota colonize the ice. The light, temperature, space and nutrient fields within which ice biota subsequently adapt and grow are the other key determinants of the biology. (Auth. mod.)

51-266

Thermodynamics of sea ice. Advanced Study Institute on the Physics of Ice Covered Seas, Savonlinna, Finland, June 6-17, 1994. Selected papers, Savonlinna, 1994, 12p. + figs., 20 refs.
Oceanography, Sea ice, Ice growth, Ice melting, Ice physics, Thermodynamic properties, Mathematical models, Ice models, Ice water interface, Snow ice interface, Snow cover effect, Ice heat flux, Thermal diffusion, Radiation absorption

51-267

Introduction to numerical modeling.
Kowalik, Z., Advanced Study Institute on the Physics of Ice Covered Seas, Savonlinna, Finland, June 6-17, 1994. Selected papers, Savonlinna, 1994, 48p., 48 refs.
Sea ice, Ice models, Mathematical models, Ice physics, Air ice water interaction, Thermodynamics, Advection, Ocean currents, Drift

51-268

Atmospheric composition in polar regions.
IUrganov, L., Advanced Study Institute on the Physics of Ice Covered Seas, Savonlinna, Finland, June 6-17, 1994. Selected papers, Savonlinna, 1994, 8p + figs.
Climatology, Climatic changes, Polar atmospheres, Aerosols, Haze, Ozone, Air pollution, Environmental impact
Global atmosphere is changing rapidly; its composition is perturbed already by a human activity. Consequences of this are numerous and cannot be predicted with certainty. Polar atmospheres have some peculiarities associated with low (practically zero) direct anthropogenic influence and specific atmospheric conditions. In some cases ("ozone hole", "arctic haze") anthropogenic impacts on polar environment are comparable with (or greater than) those observed in more populated areas. Beyond the scope of this review are numerous effects of atmospheric changes. These are, e.g., perturbations in different biological links, biomes, climatic impacts etc. (Auth. mod.)

51-269

Southern ocean oceanography and models.
Klepikov, A., Advanced Study Institute on the Physics of Ice Covered Seas, Savonlinna, Finland, June 6-17, 1994. Selected papers, Savonlinna, 1994, var. p., 31 refs.
Oceanography, Ocean currents, Hydrography, Boundary layer, Water temperature, Antarctica—Weddell Sea
Recent analysis of data obtained in Jan.-Feb. 1988 in the eastern part of the Weddell Gyre by the mesoscale survey of three USSR research vessels showed a complicated hydrographic structure that results from the intensive interaction between the waters of the Weddell Gyre and Antarctic Circumpolar Current (ACC). Three types of mesoscale features were found: warm-core eddies of circumpolar origin; warm-core eddies formed at the Weddell Front; and cold-core features from the Cold Regime of the Weddell Gyre. The inflow of the CDW into the gyre is facilitated by the sharp southward excursion of the ACC core at about 26°E due to the topographical constraint of the mid-ocean ridge. Intense warm-core eddies forming at the Antarctic Polar Front (APF) and drifting southward are visible in GEOSAT altimeter data as relatively high sea-level variability. This investigation was followed by using GEOSAT altimetry data and historical hydrographic data to estimate some characteristics of warm ACC rings in the sector 20-40°E. (Auth. mod.)

51-270

Morphological distributions—an outline of a unified mathematical formalism for the description of morphological distributions appearing in sea ice geophysics.
Lensu, M., Advanced Study Institute on the Physics of Ice Covered Seas, Savonlinna, Finland, June 6-17, 1994. Selected papers, Savonlinna, 1994, 11p., 4 refs.
Sea ice distribution, Ice cover thickness, Pressure ridges, Ice floes, Ice structure, Ice volume, Ice models, Mathematical models, Statistical analysis, Thermodynamics

51-271

Freezing estuaries and semi-enclosed basins.
Omstedt, A., Advanced Study Institute on the Physics of Ice Covered Seas, Savonlinna, Finland, June 6-17, 1994. Selected papers, Savonlinna, 1994, 34p. + figs., Refs. p.25-31.
Oceanography, Estuaries, Sea water freezing, Sea ice distribution, Atmospheric boundary layer, Runoff, Tidal currents, Ice water interface, Ice cover effect, Mathematical models

51-272

Marginal ice zone.
Squire, V.A., Advanced Study Institute on the Physics of Ice Covered Seas, Savonlinna, Finland, June 6-17, 1994. Selected papers, Savonlinna, 1994, 70p., Refs. p.28-31.
Oceanography, Sea ice distribution, Pack ice, Ice edge, Ice water interface, Ice cover effect, Gravity waves, Mathematical models
Presented here are areas which have benefitted from sustained attack on marginal ice zones (MIZs), made possible by the prophetism and generosity of various funding agencies: MIZ mesoscale oceanography, including meanders, eddies, ice edge jets and upwelling; large-scale hydrographic structure; wave-ice interaction, including both theoretical and experimental studies into how the waves affect the ice and how the ice affects the waves; meteorological research into modification of the atmospheric boundary layer by changes in surface topography and surface temperature; and sea ice physical properties and morphology, including growth mechanisms and distribution and internal ice stress in relation to modeling.

51-273

Remote sensing of sea ice.
Carsey, F., Advanced Study Institute on the Physics of Ice Covered Seas, Savonlinna, Finland, June 6-17, 1994. Selected papers, Savonlinna, 1994, var. p.
Sea ice distribution, Oceanography, Remote sensing, Radiometry, Height finding, Synthetic aperture radar, Spaceborne photography, Sounding

51-274

Designing pitched roofs for cold climates.
Russell, A.R., *Construction specifier,* Nov. 1994, 47(11), p.78-85.
Houses, Roofs, Orientation, Snow loads, Ice dams, Ice control, Surface drainage, Ventilation, Structural analysis, Cold weather construction, Design criteria, Snow cover effect

51-275

Late Quaternary sedimentation and glacial history of the western Svalbard continental margin.
Andersen, E.S., Dokken, T.M., Elverhøi, A., Solheim, A., Fossen, I., *Marine geology,* Aug. 1996, 133(3-4), p.123-156, Refs. p.153-156.
Marine geology, Glacial geology, Quaternary deposits, Marine deposits, Glacial deposits, Sedimentation, Glacier melting, Ice rafting, Drill core analysis, Lithology, Geochemistry, Norway—Svalbard

51-276

$^{87/86}$Sr, phytoplankton, and the nature of the Late Cretaceous and Early Cenozoic Arctic Ocean.
Magavern, S., Clark, D.L., Clark, S.L., *Marine geology,* Aug. 1996, 133(3-4), p.183-192, 46 refs.
Oceanography, Marine geology, Ocean currents, Paleoecology, Tectonics, Marine deposits, Plankton, Distribution, Sampling, Radioactive isotopes, Drill core analysis, Isotope analysis, Diagenesis, Arctic Ocean

51-277

Numerical study of the steady state freezing of water in an open rectangular cavity.
Oosthuizen, P.H., Paul, J.T., *International journal of heat and fluid flow,* Aug. 1996, 6(5), p.3-16, 9 refs.
Ice water interface, Water temperature, Freezing points, Density (mass/volume), Ice formation, Phase transformations, Convection, Heat transfer, Thermal diffusion, Mathematical models, Thermodynamic properties

51-278

Breakthrough loads of floating ice sheets.
Sodhi, D.S., MP 3898, *Journal of cold regions engineering,* Mar. 1995, 9(1), p.4-22, 28 refs.
Floating ice, Lake ice, River ice, Ice solid interface, Bearing strength, Dynamic loads, Shear strength, Cracking (fracturing), Ice deformation, Ice mechanics, Flexural strength, Penetration tests, Mathematical models
In this paper, a theoretical formulation is presented to derive an expression for floating ice sheet breakthrough lead using plastic limit analysis. The velocity field in the vicinity of a distributed load is assumed, and the stresses induced in the columnar ice are assumed to be the biaxial strength, which depends on the strain rate derived from assumed velocity field. The breakthrough load is obtained by equating the rate of work done by the load to the rate of energy dissipation during compression of ice caused by radial and circumferential wedging of ice during deformation. The agreement between the the-

oretical estimates and the experimental breakthrough loads is good if energy dissipation due to radial deformation along circumferential cracks is ignored.

51-279

Measurements of 220 GHz atmospheric opacity on Mt. Fuji with a radiometer/radome system.

Sekimoto, Y., et al, *International journal of infrared and millimeter waves,* July 1996, 17(7), p.1263-1284, 10 refs.

Radomes, Radiometry, Cold weather performance, Snow accumulation, Atmospheric density, Optical properties, Turbidity, Diurnal variations, Ice prevention, Snow melting, Covering, Synthetic materials, Electric heating, Design, Japan—Fuji, Mount

51-280

Seasonal changes of chlorophyll *a* and oceanographic conditions under fast ice off Zhongshan Station, East Antarctica in 1992.

He, J.F., Chen, B., Huang, F.P., *Antarctic research (Chinese edition),* June 1996, 8(2), p.23-34, In Chinese with English summary. Refs. p.33-34.

Oceanographic surveys, Chlorophylls, Ice cover effect, Marine biology, Plankton, Biomass, Antarctica—Zhongshan Station

Chlorophyll *a* concentrations under sea ice near Zhongshan Station, monitored from Apr. 12 to Dec. 30, 1992, were lower than 0.5 mg/m^3 during wintertime, and lowest (0.1 mg/m^3) from July to Sep. The concentrations began to rise during spring, and reached the maximum value of 21.40 mg/m^3 in mid-Dec. in surface water following the ice algal bloom, and then decreased quickly again. The ratios of nanoplankton (<20 μm) biomass to the total phytoplankton biomass were commonly higher than 50% in winter, but decreased following the increasing biomass in spring; the ratio in surface water was only 3.2% during the phytoplankton bloom. The nutrients were sufficient to support the growth of phytoplankton, but the concentrations decreased during spring. Comparison of phytoplankton of biomass in the water column and sea ice shows it to be less significant under the ice. Because the primary production is mostly distributed at the bottom of the ice and in the surface water, the role of ice-water interface in the ecosystem is considered to be very important. (Auth. mod.)

51-281

Palmer Station, Antarctica, long range development plan.

Wiggin, D.B., Paramus, NJ, ITT Antarctic Services, Inc., 1984, 47p. + 22 figs.

Stations, Construction, Research projects, Antarctica—Antarctic Peninsula, Antarctica—Anvers Island, Antarctica—Palmer Station

This report opens with a background of Palmer Station and its relationship to USARP operations in the Antarctic Peninsula. Detailed reviews of the required upgrades to the science support facilities and collateral improvements to the Station physical plant are then provided. The proposed LRDP for Palmer is then outlined including project scheduling and projected costs. The next sections outline construction equipment requirements and future staffing of the Station. The report closes with a summary including budgetary requirements. (Auth.)

51-282

Long-term records of growth and distribution of conifers: integration of paleoecology and physiological ecology.

Graumlich, L.J., Brubaker, L.B., Ecophysiology of coniferous forests. Edited by W.K. Smith and T.M. Hinckley, San Diego, CA, Academic Press, 1995, p.37-62, Refs. p.58-62.

DLC QK494.E36 1995

Trees (plants), Plant ecology, Forest ecosystems, Paleoecology, Paleobotany, Vegetation patterns, Revegetation, Forest lines, Phenology, Acclimatization, Paleoclimatology

51-283

Ecophysiological controls of conifer distributions.

Woodward, F.I., Ecophysiology of coniferous forests. Edited by W.K. Smith and T.M. Hinckley, San Diego, CA, Academic Press, 1995, p.79-94, Refs. p.91-94.

DLC QK494.E36 1995

Trees (plants), Taiga, Forest ecosystems, Plant ecology, Vegetation patterns, Plant physiology, Plant tissues, Acclimatization, Cold tolerance

51-284

Physiological processes during winter dormancy and their ecological significance.

Havranek, W.M., Tranquillini, W., Ecophysiology of coniferous forests. Edited by W.K. Smith and T.M. Hinckley, San Diego, CA, Academic Press, 1995, p.95-124, Refs. p.117-124.

DLC QK494.E36 1995

Trees (plants), Forest ecosystems, Vegetation patterns, Plant ecology, Plant physiology, Plant tissues, Cold tolerance, Acclimatization

51-285

Potential effects of global climate change.

Gucinski, H., Vance, E., Reiners, W.A., Ecophysiology of coniferous forests. Edited by W.K. Smith and T.M. Hinckley, San Diego, CA, Academic Press, 1995, p.309-331, Refs. p.327-331.

DLC QK494.E36 1995

Trees (plants), Taiga, Forest ecosystems, Plant ecology, Vegetation patterns, Phenology, Nutrient cycle, Atmospheric circulation, Global warming, Computerized simulation

51-286

Multiple glaciation in the McMurdo Sound region, Antarctica: a progress report.

Péwé, T.L., *Journal of geology,* Sep. 1960, 68(5), p.498-514, 19 refs.

Glacial geology, Geochronology, Glacier ice, Frozen lakes, Climate, Antarctica—McMurdo Sound, Antarctica—Taylor Valley, Antarctica—Taylor Glacier, Antarctica—Koettlitz Glacier, Antarctica—Ferrar Glacier

At least four major Quaternary glaciations, each successively less extensive than the former, are recorded in the McMurdo Sound region. Deposits of the earliest recognized glacial advance occur high on ridges and flat areas. The deposits are 2,000 feet above the valley floor, are badly weathered, and have little or no morainal form. Ice of this glaciation filled all the valleys and must have filled McMurdo Sound to an elevation of 2,000 feet. Deposits of the next two succeeding glaciations are distributed around the sound as well-preserved, but considerably subdued, moraines of both outlet and alpine glaciers. During the earlier of these two glaciations, alpine glaciers reached the expanded Koettlitz and Ferrar outlet glaciers. Outlet glaciers filled the southern part of McMurdo Sound to an elevation of about 1,000 feet. During the latter of these two advances many alpine glaciers did not reach the outlet glaciers. (Auth.)

51-287

Theory of premelting dynamics for all power law forces.

Wettlaufer, J.S., Worster, M.G., Wilen, L.A., Dash, J.G., *Physical review letters,* May 6, 1996, 76(19), p.3602-3605, 14 refs.

Ice physics, Supercooling, Liquid cooling, Water films, Liquid phases, Thermodynamic properties, Ice solid interface, Molecular energy levels, Frost heave, Static electricity, Ice dielectrics, Charge transfer

51-288

Microphysical processes associated with intense frontal rainbands and the effect of evaporation and melting on frontal dynamics.

Barth, M.C., Parsons, D.B., *Journal of the atmospheric sciences,* June 1, 1996, 53(11), p.1569-1586, 37 refs.

Precipitation (meteorology), Fronts (meteorology), Cloud physics, Shear flow, Cooling, Snow pellets, Ice melting, Ice water interface, Sounding, Latent heat, Simulation, Mathematical models

51-289

Comments on "The temperature of evaporating sea spray droplets".

Kepert, J.D., Andreas, E.L., MP 3899, *Journal of the atmospheric sciences,* June 1, 1996, 53(11), p.1634-1645, 22 refs. Includes reply. For pertinent paper see 49-5389.

Marine atmospheres, Cloud physics, Cloud droplets, Turbulent boundary layer, Sea spray, Evaporation, Water temperature, Temperature variations, Forecasting, Statistical analysis, Computerized simulation, Analysis (mathematics)

The time evolution of a single sea spray droplet can be conveniently understood in terms of the time for the droplet temperature to change from the sea surface temperature to its evaporation temperature T_{ev}. Andreas (1995, henceforth A95) derives and presents a set of reasonable approximations to T_{ev}, which are useful for part of the relevant parameter space. Here are presented two alternative approximations, derived in a mathematically somewhat more formal manner, which are more accurate than those of A95, are valid over a much wider range of the parameter space, and are computationally of similar efficiency.

51-290

Influence of crystal shapes on radiative fluxes in visible wavelength: ice crystals randomly oriented in space.

Chervet, P., Isaka, H., Nakajima, T., *Annales geophysicae,* Aug. 1996, 14(8), p.837-844, 35 refs.

Climatology, Cloud physics, Optical properties, Radiation balance, Attenuation, Ice crystal optics, Ice crystal structure, Orientation, Light scattering, Water content, Simulation

51-291

Remnant of water-rock interaction on the lunar surface.

Takahashi, K., *RIKEN review,* Aug. 1995, No.10, p.37-38, 10 refs.

Satellites (natural), Water supply, Extraterrestrial ice, Regolith, Sediments, Geochemistry, Isotope analysis, Sampling

Lunar meteorites recovered in Antarctica are recognized to have been derived from the lunar highlands and these meteorites show several characteristic features in their chemical (major element compositions and trace element abundance, rare earth elements) and isotopic systems (^{87}Rb-^{87}Sr systematics). These features imply the existence of H_2O (maybe as ice) on the surface of the ancient (before 4.0 bya) moon. This study examines such meteorite samples. (Auth. mod.)

51-292

Russian radioactive waste dump in the Arctic.

Marine pollution bulletin, Apr. 1996, 32(4), p.325-326.

Oceanography, Estuaries, Water pollution, Radioactive wastes, Waste disposal, Environmental impact, Russia—Kola Peninsula

51-293

Late Tertiary to late Quaternary record in the Mackenzie Mountains, Northwest Territories, Canada: stratigraphy, paleosols, paleomagnetism, and chlorine-36.

Duk-Rodkin, A., Barendregt, R.W., Tarnocai, C., Phillips, F.M., *Canadian journal of earth sciences,* June 1996, 33(6), p.875-895, With French summary. 50 refs.

Geologic structures, Geological surveys, Glacial deposits, Glacier oscillation, Pleistocene, Quaternary deposits, Stratigraphy, Rock magnetism, Geomagnetism, Geochronology, Sedimentation, Classifications, Canada—Northwest Territories—Mackenzie Mountains

51-294

Paleomagnetic evidence for late Cenozoic glaciations in the Mackenzie Mountains of the Northwest Territories, Canada.

Barendregt, R.W., Enkin, R.J., Duk-Rodkin, A., Baker, J., *Canadian journal of earth sciences,* June 1996, 33(6), p.896-903, With French summary. 13 refs.

Pleistocene, Quaternary deposits, Glacial geology, Glacier oscillation, Glacial deposits, Geomagnetism, Remanent magnetism, Lithology, Stratigraphy, Correlation, Geochronology, Canada—Northwest Territories—Mackenzie Mountains

51-295

Early Pleistocene volcanism and glaciation in central Yukon: a new chronology from field studies and paleomagnetism.

Jackson, L.E., Jr., Barendregt, R.W., Baker, J., Irving, E., *Canadian journal of earth sciences,* June 1996, 33(6), p.904-916, With French summary. 51 refs.

Pleistocene, Quaternary deposits, Glaciation, Magma, Stratigraphy, Geomagnetism, Geochronology, Radioactive age determination, Lithology, Canada—Yukon Territory—Fort Selkirk

51-296

High-resolution late-glacial and early Holocene diatom record from Baffin Island, eastern Canadian Arctic.

Wolfe, A.P., *Canadian journal of earth sciences,* June 1996, 33(6), p.928-937, With French summary. 49 refs.

Paleoclimatology, Subpolar regions, Paleoecology, Algae, Quaternary deposits, Lacustrine deposits, Stratigraphy, Geochronology, Radioactive age determination, Canada—Northwest Territories—Baffin Island

51-297

Cold and heat resistance of five species of *Sphagnum*.

Balagurova, N., Drozdov, S., Grabovik, S., *Annales botanici Fennici,* 1996, 33(1), p.33-37, 23 refs.

Plant physiology, Plant tissues, Frost resistance, Cold tolerance, Peat, Mosses, Growth, Temperature effects, Cold weather tests

51-298

Thermodynamic stability of hexagonal and cubic ices.

Tanaka, H., Okabe, I., *Chemical physics letters,* Sep. 13, 1996, 259(5-6), p.593-598, 14 refs.

Ice physics, Cubic ice, Thermodynamic properties, Stability, Molecular energy levels, Molecular structure, Proton transport, Temperature effects, Simulation, Statistical analysis

51-299

Effect of initial dry and wet conditions of concrete on freezing and thawing resistance and mathematical analysis of deterioration.

Kato, K., Kato, N., Kawai, T., *Materials science research international,* Dec. 1995, 1(4), p.221-225, 3 refs.

Concrete freezing, Concrete durability, Frost action, Frost resistance, Water cement ratio, Freeze thaw tests, Mathematical models

51-300

Organic compounds in antarctic sea-water and pack-ice.

Desideri, P.G., Lepri, L., Checchini, L., Santianni, D., Masi, F., Bao, M., *International journal of environmental analytical chemistry,* 1995, Vol.61, p.319-330, 17 refs.

Sea water, Water chemistry, Water pollution, Ice water interface, Ice formation, Pack ice, Ice cores, Ice composition, Impurities, Antarctica—Terra Nova Bay, Antarctica—Wood Bay, Antarctica—Ross Sea

Pack-ice and sea-water samples collected at different depths from Terra Nova Bay and Ross Sea during the 1990-91 Italian Antarctic Expedition were analyzed using HRGC and GC-MS. Several classes of biogenic and anthropogenic organic compounds were identified and measured in both matrices. The results showed the changes in the organic composition at varying depths of pack-ice and sea-water and the enrichment of organic compounds in the pack. (Auth.)

51-301

Spring thaw at the Minnesota Road Research Project testing facility.

Kestler, M.A., Berg, R.L., Schrader, C., Johnson, G., MP 3900, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, 1995, 15p., 12 refs. To be presented at the 4th International Symposium on Unbound Aggregates in Roads (UNBAR4), Nottingham, England, July 17-19, 1995.

Pavements, Subgrade soils, Soil trafficability, Frost penetration, Thaw depth, Thaw weakening, Bearing strength, Impact tests, Road maintenance, United States—Minnesota

The Minnesota Road Research Project (Mn/ROAD), approximately 64 km (40 mi) northwest of Minneapolis, MN, comprises forty 150-m (500-ft) long pavement test cells. The cells were designed for several different service lives, and are composed of a variety of thicknesses and materials. An intensive monitoring program was undertaken in Mar. and Apr. 1994 to assess variations in pavement strength through spring thaw. Observations were conducted on 14 test cells by the U.S. Army Corps of Engineers Cold Regions Research and Engineering Laboratory (CRREL) and Minnesota Department of Transportation (Mn/DOT). For six weeks, soil moisture, frost depths and thaw depths were measured and Heavy Weight Deflectometer (HWD) tests were conducted. A multivariate analysis was conducted on these data for a test cell comprising 146 mm (5.75 in.) of asphalt concrete and 838 mm (33 in.) of aggregate base course. From the analysis, correlations between various parameters were determined and simple indices for estimating layer moduli from HWD data were developed.

51-302

Cold weather operations—can simulation be the road to victory.

Link, L.E., Jr., Hill, D.R., MP 3901, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, 1995, 15p., Refs. passim. Presented at the Army Operations Research Symposium, Fort Lee, VA, Oct 10-12, 1995.

Cold weather operation, Military operation, Military research, Environment simulation

51-303

On the process of lake ice formation.

Bowser, C.J., Gat, J.R., Proceedings series. International Symposium on Isotopes in Water Resources Management, Vienna, Austria, Mar. 20-24, 1995. Vol.1, Vienna, Austria, International Atomic Energy Agency, 1996, p.209-210, 2 refs.

DLC GB1197.6.S96 1995

Lake ice, Ice formation, Ice cores, Ice composition, Isotope analysis

51-304

Ecology of the southern conifers.

Enright, N.J., ed, Hill, R.S., ed, Washington, D.C., Smithsonian Institution Press, 1995, 342p., Refs. p.288-321. For selected papers see 51-305 through 51-309.

DLC QK494.E345 1995

Trees (plants), Plant ecology, Forest ecosystems, Vegetation patterns, Revegetation, Paleobotany, Paleoclimatology

51-305

Quaternary history of the southern conifers.

Kershaw, A.P., McGlone, M.S., Ecology of the southern conifers. Edited by N.J. Enright and R.S. Hill, Washington, D.C., Smithsonian Institution Press, 1995, p.30-63, Refs. p.288-321.

DLC QK494.E345 1995

Trees (plants), Plant ecology, Paleobotany, Forest ecosystems, Vegetation patterns, Revegetation, Acclimatization, Paleoclimatology

51-306

Community dynamics of the New Zealand conifers.

Ogden, J., Stewart, G.H., Ecology of the southern conifers. Edited by N.J. Enright and R.S. Hill, Washington, D.C., Smithsonian Institution Press, 1995, p.81-119, Refs. p.288-321.

DLC QK494.E345 1995

Trees (plants), Forest ecosystems, Plant ecology, Vegetation patterns, Revegetation, Paleobotany, Paleoclimatology, New Zealand

51-307

Ecology of the conifers of southern South America.

Veblen, T.T., Burns, B.R., Kitzberger, T., Lara, A., Villalba, R., Ecology of the southern conifers. Edited by N.J. Enright and R.S. Hill, Washington, D.C., Smithsonian Institution Press, 1995, p.120-155, Refs. p.288-321.

DLC QK494.E345 1995

Trees (plants), Plant ecology, Forest ecosystems, Forest lines, Vegetation patterns, Revegetation, Phenology, Paleobotany, Paleoclimatology, Chile, Argentina

51-308

Conifer forests of the Chilean coastal range.

Armesto, J.J., et al, Ecology of the southern conifers. Edited by N.J. Enright and R.S. Hill, Washington, D.C., Smithsonian Institution Press, 1995, p.156-170, Refs. p.288-321.

DLC QK494.E345 1995

Trees (plants), Plant ecology, Forest ecosystems, Forest lines, Vegetation patterns, Revegetation, Paleobotany, Paleoclimatology, Chile

51-309

Conifers of southern Australia.

Gibson, N., Barker, P.C.J., Cullen, P.J., Shapcott, A., Ecology of the southern conifers. Edited by N.J. Enright and R.S. Hill, Washington, D.C., Smithsonian Institution Press, 1995, p.223-251, Refs. p.288-321.

DLC QK494.E345 1995

Trees (plants), Plant ecology, Forest ecosystems, Vegetation patterns, Revegetation, Phenology, Plant physiology, Australia—Tasmania

51-310

Physical simulation of powder snow avalanches: experiment on the dynamics of three-dimensional runout. [Physikalische Simulation von Staublawinen: Experimente zur Dynamik im dreidimensionalen Auslauf]

Keller, S., *Zürich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen,* 1996, No.141, 249p., In German with English and French summaries. 48 refs.

Avalanche modeling, Avalanche mechanics, Avalanche tracks, Avalanche deposits, Snow cover stability, Snow density, Snow strength, Environmental tests, Mathematical models

51-311

Orogenic evolution of the Ural Mountains: results from an integrated seismic experiment.

Berzin, R., et al, *Science,* Oct. 11, 1996, 274(5285), p.220-221, 29 refs.

Geologic structures, Geologic processes, Seismic surveys, Russia—Ural Mountains, Russia—Magnetogorsk, Russia—Kartaly

51-312

Crustal root beneath the Urals: wide-angle seismic evidence.

Carbonell, R., et al, *Science,* Oct. 11, 1996, 274(5285), p.222-224, 13 refs.

Geologic structures, Geologic processes, Earth crust, Seismic surveys, Russia—Ural Mountains, Russia—Magnetogorsk, Russia—Kartaly

51-313

Preserved collisional crustal structure of the southern Urals revealed by vibroseis profiling.

Echtler, H.P., et al, *Science,* Oct. 11, 1996, 274(5285), p.224-226, 13 refs.

Geologic structures, Geologic processes, Seismic surveys, Earth crust, Seismic reflection, Russia—Ural Mountains, Russia—Magnetogorsk, Russia—Kartaly

51-314

Lithosphere-scale seismic image of the southern Urals from explosion-source reflection profiling.

Knapp, J.H., et al, *Science,* Oct. 11, 1996, 274(5285), p.226-228, 13 refs.

Geologic structures, Geologic processes, Earth crust, Seismic reflection, Seismic surveys, Russia—Ural Mountains, Russia—Magnetogorsk, Russia—Kartaly

51-315

Mini-surge on the Ryder Glacier, Greenland, observed by satellite radar interferometry.

Joughin, I., Tulaczyk, S., Fahnestock, M., Kwok, R., *Science,* Oct. 11, 1996, 274(5285), p.228-230, 18 refs.

Glacier flow, Glacier surges, Remote sensing, Measuring instruments, Greenland

51-316

1996 antarctic ozone hole.

Hofmann, D.J., *Nature,* Sep. 12, 1996, 383(6596), p.129, 8 refs.

Ozone, Atmospheric composition, Chemical composition, Stratosphere, Air temperature, Antarctica—Amundsen-Scott Station

This brief report provides an update on the status of stratospheric ozone loss over Antarctica. Measurements of Dobson Units over the South Pole region are cited and compared with those of prior years. The earlier effects of the QBO-related temperature changes and the Pinatubo aerosol appear to have ceased. The rate of ozone destruction over the South Pole is trending to be high in 1996.

51-317

Recent changes in tropical freezing heights and the role of sea surface temperature.

Diaz, H.F., Graham, N.E., *Nature,* Sep. 12, 1996, 383(6596), p.152-155, 25 refs.

Air temperature, Humidity, Mountain glaciers, Glacier melting, Water temperature, Sea water, Surface temperature

51-318

Atmospheric gas concentrations over the past century measured in air from firn at the South Pole.

Battle, M., et al, *Nature,* Sep. 19, 1996, 383(6597), p.231-235, 51 refs.

Atmospheric composition, Gases, Carbon dioxide, Oxygen, Ice cores, Firn, Snow composition, Antarctica—Amundsen-Scott Station

The extraction and analysis of air from the snowpack (firn) at the South Pole provides atmospheric concentration histories of biogenic greenhouse gases since the beginning of the present century which confirm and expand on those derived from studies of air trapped in ice cores. Furthermore, calculations based on the inferred atmospheric concentrations of oxygen and carbon dioxide indicate that—in contrast to the past few years—the terrestrial biosphere was neither a source nor sink of CO_2 between ca. 1977 and 1985. (Auth.)

51-319

Ross Island area wind field.

Stearns, C.R., 10p. + additional figs., Unpublished report of a 1989 workshop, Port Hueneme, CA.

Weather forecasting, Wind (meteorology), Meteorological instruments, Weather stations, Synoptic meteorology, Antarctica—Ross Island, Antarctica—McMurdo Station, Antarctica—Minna Bluff

Presented here is information on the wind field in the Ross I. area and suggestions for deployment of additional automatic weather stations during the 1990-1991 field season. The purpose is to improve the forecasting and understanding of the weather conditions for aircraft operating from the area of the Ross Ice Shelf near McMurdo. Two or more years of experience with the present and additional AWS units will be needed before any significant improvement should be expected in forecasting weather conditions. In view of the future requirements for aircraft operations the AWS units should be in place as soon as possible. Then a significant effort should be directed towards the improvement of short-term weather forecasts. This will require synoptic workshops each year on the results of the previous season's weather forecasts for aircraft operations.

51-320

Compression of ice to 210 gigapascals: infrared evidence for a symmetric hydrogen-bonded phase.

Goncharov, A.F., Struzhkin, V.V., Somayazulu, M.S., Hemley, R.J., Mao, H.K., *Science,* July 12, 1996, 273(5272), p.218-220, 58 refs.

High pressure ice, Deuterium oxide ice, Hydrogen bonds, Infrared spectroscopy

51-321

Bits of ice XI and ice XII.

Szpir, M., *American scientist,* Sep.-Oct. 1996, 84(5), p.437-438.

Ice physics, Molecular structure, Ice crystal structure, High pressure ice, Computerized simulation, Density (mass/volume), Solid phases

51-322

Earth's shrinking glaciers. *Geotimes,* Oct. 1995, 40(10), p.7-8.

Glacial hydrology, Glacier oscillation, Glacier ablation, Glacier surges, Glacier mass balance, Periodic variations, Climatic factors

51-323

Adaptation of stomatal response of *Camellia rusticana* to a heavy snowfall environment: winter drought and net photosynthesis.

Kume, A., Tanaka, C., *Ecological research,* Aug. 1996, 11(2), p.207-216, 28 refs.

Plants (botany), Plant physiology, Plant tissues, Damage, Cold tolerance, Photosynthesis, Desiccation, Insulation, Snow cover effect, Microclimatology

51-324

Prognostic cloud water parameterization for global climate models.

Del Genio, A.D., Yao, M.S., Kovari, W., Lo, K.K.W., *Journal of climate,* Feb. 1996, 9(2), p.270-304, 69 refs.

Climatology, Cloud cover, Cloud physics, Atmospheric density, Optical properties, Radiation balance, Light scattering, Water content, Heterogeneous nucleation, Ice crystal optics, Long range forecasting, Mathematical models

51-325

Low-frequency variability in the arctic atmosphere, sea ice, and upper-ocean climate system.

Bitz, C.M., Battisti, D.S., Moritz, R.E., Beesley, J.A., *Journal of climate,* Feb. 1996, 9(2), p.394-408, 28 refs.

Climatology, Polar atmospheres, Air ice water interaction, Heat balance, Surface energy, Ice cover thickness, Ice volume, Ice cover effect, Snowmelt, Albedo, Seasonal variations, Mathematical models, Thermodynamics, Simulation, Long range forecasting

51-326

Snow cover and snow mass intercomparisons of general circulation models and remotely sensed datasets.

Foster, J., et al, *Journal of climate,* Feb. 1996, 9(2), p.409-426, 34 refs.

Climatology, Snow hydrology, Snow cover distribution, Snow depth, Hydrologic cycle, Radiometry, Correlation, Accuracy, Snow cover effect, Long range forecasting, Mathematical models, Simulation

51-327

Recent decrease of sea level pressure in the central Arctic.

Walsh, J.E., Chapman, W.L., Shy, T.L., *Journal of climate,* Feb. 1996, 9(2), p.480-486, 25 refs.

Climatology, Polar atmospheres, Atmospheric circulation, Wind direction, Sea ice distribution, Drift, Air ice water interaction, Ice cover effect, Atmospheric boundary layer, Atmospheric pressure, Seasonal variations, Statistical analysis

51-328

Risk of sea level rise.

Titus, J.G., Narayanan, V., *Climatic change,* June 1996, 33(2), p.151-212, Refs. p.209-212.

Climatology, Global warming, Surface temperature, Glacier melting, Snowmelt, Ice melting, Sea level, Simulation, Models, Statistical analysis

This paper estimates the probability distribution of future sea level rise implied by the subjective assessments of 20 climate and glacial process modelers regarding particular processes on which they have developed some expertise. Effects on the polar ice sheets are included. The results from combining all the models and reviewer assumptions are summarized and a procedure for projecting sea level at particular locations is presented. (Auth. mod.)

51-329

Critical cooling and warming rates to avoid ice crystallization in small pieces of mammalian organs permeated with cryoprotective agents.

Peyridieu, J.F., et al, *Cryobiology,* Aug. 1996, 33(4), p.436-446, 29 refs.

Cryobiology, Porous materials, Solutions, Antifreezes, Phase transformations, Ice crystal growth, Vitreous ice, Ice prevention, Cooling rate, Freezing points, Temperature measurement, Preserving

51-330

Experimental study of the mechanical response of frozen biological tissues at cryogenic temperatures.

Rabin, Y., Steif, P.S., Taylor, M.J., Julian, T.B., Wolmark, N., *Cryobiology,* Aug. 1996, 33(4), p.472-482, 24 refs.

Cryobiology, Freezing, Ice physics, Mechanical properties, Ice strength, Shear stress, Stress concentration, Plastic deformation, Compressive properties, Mechanical tests

51-331

Generalized numerical modelling of unsteady heat transfer during cooling and freezing using an improved enthalpy method and quasi-one-dimensional formulation.

Fikiin, K.A., *International journal of refrigeration,* Feb. 1996, 19(2), p.132-140, With French summary. 40 refs.

Heat transfer, Freeze thaw cycles, Phase transformations, Solid phases, Frozen liquids, Stefan problem, Enthalpy, Thermal conductivity, Boundary value problems, Computerized simulation, Mathematical models, Refrigeration

51-332

Cool clouds.

Schlatter, T., *Weatherwise,* June-July 1996, 49(3), p.34.

Weather observations, Clouds (meteorology), Optical phenomena, Ice crystals, Ice formation

51-333

Cross-correlation analysis of the dynamics of methane emissions from a boreal peatland.

Kettunen, A., Kaitala, V., Alm, J., Silvola, J., Nykänen, H., Martikainen, P.J., *Global biogeochemical cycles,* Sep. 1996, 10(3), p.457-471, 54 refs.

Wetlands, Peat, Ecosystems, Water table, Subarctic landscapes, Geochemical cycles, Soil air interface, Natural gas, Vapor diffusion, Sampling, Temperature effects, Greenhouse effect, Statistical analysis

51-334

Diffusional flux of CO_2 through snow: spatial and temporal variability among alpine-subalpine sites.

Sommerfeld, R., Massman, W.J., Musselman, R.C., Mosier, A.R., *Global biogeochemical cycles,* Sep. 1996, 10(3), p.473-482, 18 refs.

Ecosystems, Alpine landscapes, Snow air interface, Soil chemistry, Snow cover effect, Carbon dioxide, Vapor diffusion, Geochemical cycles, Seasonal variations, Statistical analysis

51-335

Nordic Seas-Arctic Ocean carbon budget from volume flows and inorganic carbon data.

Lundberg, L., Haugan, P.M., *Global biogeochemical cycles,* Sep. 1996, 10(3), p.493-510, 60 refs.

Oceanography, Geochemical cycles, Air water interactions, Carbon dioxide, Ocean currents, Advection, Mass transfer, Turbulent diffusion, Water chemistry, Statistical analysis, Arctic Ocean

51-336

Multiwavelength observations of a developing cloud system: the FIRE II 26 November 1991 case study.

Intrieri, J.M., et al, *Journal of the atmospheric sciences,* Dec. 1, 1995, 52(23), p.4079-4093, 31 refs.

Climatology, Cloud cover, Cloud physics, Remote sensing, Lidar, Radiometry, Radar echoes, Ice detection, Ice crystal optics, Backscattering, Spectra, Profiles, Correlation

51-337

Dynamical structure and turbulence in cirrus clouds: aircraft observations during FIRE.

Gultepe, I., Starr, D.O., *Journal of the atmospheric sciences,* Dec. 1, 1995, 52(23), p.4159-4182, 70 refs.

Climatology, Cloud cover, Static stability, Cloud physics, Gravity waves, Turbulent exchange, Heat flux, Ice crystals, Saturation, Sounding, Stratification, Spectra

51-338

Upper-tropospheric aerosol sampled during project FIRE IFO II.

Hagen, D.E., Podzimek, J., Trueblood, M.B., *Journal of the atmospheric sciences,* Dec. 1, 1995, 52(23), p.4196-4209, 46 refs.

Climatology, Cloud physics, Cloud droplets, Condensation nuclei, Ice nuclei, Ice crystal growth, Aerosols, Particle size distribution, Supersaturation, Heterogeneous nucleation, Sampling

51-339

Cirrus cloud properties derived from high spectral resolution infrared spectrometry during FIRE II. Part III: ground-based HIS results.

Collard, A.D., et al, *Journal of the atmospheric sciences,* Dec. 1, 1995, 52(23), p.4264-4275, 14 refs.

Climatology, Cloud cover, Optical properties, Cloud physics, Infrared spectroscopy, Sounding, Radiance, Ice crystal optics, Scattering, Spectra

51-340

Relating cirrus cloud properties to observed fluxes: a critical assessment.

Vogelmann, A.M., Ackerman, T.P., *Journal of the atmospheric sciences,* Dec. 1, 1995, 52(23), p.4285-4301, 43 refs.

Climatology, Cloud cover, Cloud physics, Optical properties, Scattering, Radiation balance, Ice crystal optics, Ice nuclei, Particle size distribution, Simulation

51-341

Understanding satellite cirrus cloud climatologies with calibrated lidar optical depths.

Wylie, D., Piironen, P., Wolf, W., Eloranta, E., *Journal of the atmospheric sciences,* Dec. 1, 1995, 52(23), p.4327-4343, 22 refs.

Climatology, Cloud cover, Supercooled clouds, Cloud physics, Optical properties, Ice crystal optics, Lidar, Radiometry, Spaceborne photography, Scattering, Radiation balance

51-342

Evaluation of seasonal to decadal scale deuterium and deuterium excess signals, GISP2 ice core, Summit, Greenland, A.D. 1270-1985.

Barlow, L.K., Boulder, University of Colorado, 1994, 289p., University Microfilms order No. DA9518598, Ph.D. thesis. Multiple refs.

Climatology, Climatic changes, Ice sheets, Precipitation (meteorology), Ice cores, Sampling, Snow composition, Vapor diffusion, Isotope analysis, Surface temperature, Air temperature, Temperature variations, Seasonal variations, Ice air interface, Greenland—Summit

51-343

Climatic variations and forcing mechanisms of the last 2000 years.

Jones, P.D., ed, Bradley, R.S., ed, Jouzel, J., ed, North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I: Global environmental change, Vol.41, Berlin, Springer-Verlag, 1996, 649p., Refs. passim. Proceedings of a NATO Advanced Research Workshop held at Il Ciocco, Lucca, Italy, Oct. 3-7, 1994. For selected papers see 51-344 through 51-363 or F-55916 through F-55918, I-55915, I-55919 and I-55920.

DLC QC884.C59 1996

Paleoclimatology, Global change, Atmospheric circulation, Paleobotany, Plant ecology, Phenology, Ice cores, Ice composition, Ice dating

Based on high-resolution proxy records available for the past 2000 years, which is the period of most relevance to the next century and the study of the magnitude of natural climatic variability, this volume, a collection of papers presented at the Workshop, consists of 7 sections. Five sections consider, respectively, Dendroclimatology, Ice cores, Corals, Historical evidence, and Varved sediments. The final 2 sections consider the histories of various forcing factors, and attempts to bring records together from a variety of sources and provide explanations. The book ends with some conclusions and recommendations by the editors.

51-344

Tree-ring variables as proxy-climate indicators: problems with low-frequency signals.

Briffa, K.R., Jones, P.D., Schweingruber, F.H., Karlén, W., Shiiatov, S.G., Climatic variations and forcing mechanisms of the last 2000 years. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.41. Edited by P.D. Jones, R.S. Bradley, and J. Jouzel, Berlin, Springer-Verlag, 1996, p.9-41, Refs. p.38-41.

DLC QC884.C59 1996

Plant ecology, Paleobotany, Phenology, Growth, Age determination, Paleoclimatology, Global warming, Statistical analysis

51-345

Tree-ring density networks for climate reconstruction.

Schweingruber, F.H., Briffa, K.R., Climatic variations and forcing mechanisms of the last 2000 years. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.41. Edited by P.D. Jones, R.S. Bradley, and J. Jouzel, Berlin, Springer-Verlag, 1996, p.43-66, Refs. p.62-66.

DLC QC884.C59 1996

Plant ecology, Paleobotany, Phenology, Growth, Age determination, Climatic changes, Paleoclimatology, Statistical analysis

51-346

Millennial and near-millenial scale dendroclimatic studies in northern North America.

Jacoby, G.C., D'Arrigo, R.D., Luckman, B.H., Climatic variations and forcing mechanisms of the last 2000 years. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.41. Edited by P.D. Jones, R.S. Bradley, and J. Jouzel, Berlin, Springer-Verlag, 1996, p.67-84, 43 refs.

DLC QC884.C59 1996

Plant ecology, Paleobotany, Phenology, Growth, Forest lines, Paleoclimatology, Climatic changes, Statistical analysis

51-347

Reconciling the glacial and dendrochronological records for the last millenium in the Canadian Rockies.

Luckman, B.H., Climatic variations and forcing mechanisms of the last 2000 years. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.41. Edited by P.D. Jones, R.S. Bradley, and J. Jouzel, Berlin, Springer-Verlag, 1996, p.85-108, Refs. p.105-108.

DLC QC884.C59 1996

Alpine glaciation, Mountain glaciers, Glacier oscillation, Moraines, Forest lines, Paleobotany, Phenology, Age determination, Paleoclimatology, Canada—Rocky Mountains

51-348

Multimillenial dendroclimatic studies from the western United States.

Hughes, M.K., Graumlich, L.J., Climatic variations and forcing mechanisms of the last 2000 years. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.41. Edited by P.D. Jones, R.S. Bradley, and J. Jouzel, Berlin, Springer-Verlag, 1996, p.109-124, Refs. p.121-124.

DLC QC884.C59 1996

Plant ecology, Paleobotany, Phenology, Growth, Age determination, Precipitation (meteorology), Desiccation, Paleoclimatology, Statistical analysis, United States

51-349

Inter-decadal climate oscillations in the Tasmanian sector of the Southern Hemisphere: evidence from tree rings over the past three millennia.

Cook, E.R., Buckley, B.M., D'Arrigo, R.D., Climatic variations and forcing mechanisms of the last 2000 years. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.41. Edited by P.D. Jones, R.S. Bradley, and J. Jouzel, Berlin, Springer-Verlag, 1996, p.141-160, 15 refs.

DLC QC884.C59 1996

Plant ecology, Paleobotany, Phenology, Paleoclimatology, Global change, Australia—Tasmania

51-350

Interdecadal climatic variations in millennial temperature reconstructions from southern South America.

Villalba, R., et al, Climatic variations and forcing mechanisms of the last 2000 years. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.41. Edited by P.D. Jones, R.S. Bradley, and J. Jouzel, Berlin, Springer-Verlag, 1996, p.161-189, Refs. p.186-189.

DLC QC884.C59 1996

Plant ecology, Paleobotany, Phenology, Paleoclimatology, Global change, Argentina—Patagonia

51-351

Frequency analysis of an annually resolved, 700 year paleoclimate record from the GISP2 ice core.

White, J.W.C., Gorodetzky, D., Cook, E.R., Barlow, L.K., Climatic variations and forcing mechanisms of the last 2000 years. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.41. Edited by P.D. Jones, R.S. Bradley, and J. Jouzel, Berlin, Springer-Verlag, 1996, p.193-212, 19 refs.

DLC QC884.C59 1996

Ice sheets, Ice cores, Ice composition, Isotope analysis, Paleoclimatology, Statistical analysis, Greenland

51-352

Climate reconstruction from water isotopes: what do we learn from isotopic models?

Jouzel, J., Koster, R.D., Joussaume, S., Climatic variations and forcing mechanisms of the last 2000 years. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.41. Edited by P.D. Jones, R.S. Bradley, and J. Jouzel, Berlin, Springer-Verlag, 1996, p.213-241, Refs. p.239-241.

DLC QC884.C59 1996

Atmospheric circulation, Atmospheric composition, Snow air interface, Snow composition, Ice composition, Ice cores, Isotope analysis, Global change, Paleoclimatology, Computerized simulation

The documented distributions of HDO and $H_2{}^{18}O$ in modern precipitation show clear relationships between these concentrations and certain climatic variables. Of particular interest is the linear relationship, in middle and high latitudes, between mean annual isotope concentration and mean annual temperature at the precipitation site. Paleoclimatologists have used this relationship to infer paleotemperatures from isotope paleodata, which can be extracted, for example, for polar ice and high altitude tropical glaciers. Antarctic and Greenland data are shown in graphs. (Auth.)

51-353

Climate changes in the Atlantic sector of Antarctica over the past 500 years from ice-core and other evidence.

Peel, D.A., Mulvaney, R., Pasteur, E.C., Chenery, C., Climatic variations and forcing mechanisms of the last 2000 years. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.41. Edited by P.D. Jones, R.S. Bradley, and J. Jouzel, Berlin, Springer-Verlag, 1996, p.243-262, Refs. p.260-262.

DLC QC884.C59 1996

Polar atmospheres, Atmospheric circulation, Air ice water interaction, Glacier oscillation, Ice cores, Ice composition, Isotope analysis, Global change, Paleoclimatology, Antarctica—Antarctic Peninsula, Antarctica—Weddell Sea

Evidence from ice cores, borehole temperatures, early expeditions and glacier margins is used to identify the major climate trends of the past 500 years in the Antarctic Peninsula region. Apparent conflicts among the different data sources are exposed and causes discussed. Ice-core records from areas influenced by the Weddell Sea appear to be strongly sensitive to ice-edge effects, which can be detected in the profiles of deuterium excess and methane sulphonic acid. The various data now appear to be consistent with a scenario where conditions during the mid-19th century to 1940s period was fairly cool until the onset of the recent extensive warming in the post-1940s period. The coldest period of the past 300 years appears to have occurred around 1760-1780, associated with strong disturbances in the atmospheric circulation in the Weddell Sea region. This may be contemporaneous with a rather stronger cold anomaly previously observed at Law Dome and suggested for ice cores recovered elsewhere in East Antarctica. (Auth.)

51-354

Holocene climate changes recorded in an East Antarctica ice core.

Mosley-Thompson, E., Climatic variations and forcing mechanisms of the last 2000 years. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.41. Edited by P.D. Jones, R.S. Bradley, and J. Jouzel, Berlin, Springer-Verlag, 1996, p.263-279, 22 refs.

DLC QC884.C59 1996

Ice sheets, Ice cores, Ice composition, Ice dating, Firn stratification, Isotope analysis, Paleoclimatology, Antarctica—East Antarctica

Records from the Antarctic Peninsula indicate a strong 20th century warming in which the high plateau of East Antarctica has not participated. Similarly, a recent Neoglacial cooling was prominent in East Antarctica, but absent in the Peninsula region. A new history of oxygen isotopic ratios ($\delta^{18}O$) and atmospheric dust concentrations from central East Antarctica suggest that the high inland plateau has been

dominated by a cooling trend for the last 4000 years. Superimposed upon this isotopically-inferred cooling were a number of warmer events, the largest and most persistent of which occurred ≈3600 yr. BP and lasted several centuries. The most prominent event was a prolonged cold phase around 2200 yr BP which is correlative with a mid-Neoglacial advance on South Georgia. Most intriguing are several shorter-term (multi-centennial scale) $\delta^{18}O$ oscillations which are similar in magnitude to the glacial-interglacial transition in antarctic ice cores. Although it is impossible to discount the effect of wind scouring and re-deposition in this low snow accumulation region, this 4000-year history raises important questions about the climate history on the high inland plateau during the last half of the Holocene. (Auth. mod.)

51-355

Climatic changes for the last 2000 years inferred from ice-core evidence in tropical ice cores.

Thompson, L.G., Climatic variations and forcing mechanisms of the last 2000 years. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.41. Edited by P.D. Jones, R.S. Bradley, and J. Jouzel, Berlin, Springer-Verlag, 1996, p.281-295, 19 refs.
DLC QC884.C59 1996

Mountain glaciers, Ice cores, Ice composition, Firn stratification, Ice dating, Isotope analysis, Global change, Paleoclimatology, China—Qinghai-Xizang Plateau, Peru

51-356

Inter-comparison of ice core $\delta(^{18}O)$ and precipitation records from sites in Canada and Greenland over the last 3500 years and over the last few centuries using EOF techniques.

Fisher, D.A., et al, Climatic variations and forcing mechanisms of the last 2000 years. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.41. Edited by P.D. Jones, R.S. Bradley, and J. Jouzel, Berlin, Springer-Verlag, 1996, p.297-328, 39 refs.
DLC QC884.C59 1996

Ice sheets, Ice cores, Ice composition, Ice dating, Firn stratification, Isotope analysis, Paleoclimatology, Statistical analysis, Canada—Northwest Territories, Greenland

51-357

Reconstructions of past climate from historical sources in the Czech Lands.

Brázdil, R., Climatic variations and forcing mechanisms of the last 2000 years. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.41. Edited by P.D. Jones, R.S. Bradley, and J. Jouzel, Berlin, Springer-Verlag, 1996, p.409-431, Refs. p.428-431.
DLC QC884.C59 1996

Climatic changes, Global change, Paleoclimatology, Air temperature, Precipitation (meteorology), Meteorological data, History, Statistical analysis, Czech Republic

51-358

Varved sediment records of recent seasonal to millennial-scale environmental variability.

Overpeck, J.T., Climatic variations and forcing mechanisms of the last 2000 years. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.41. Edited by P.D. Jones, R.S. Bradley, and J. Jouzel, Berlin, Springer-Verlag, 1996, p.479-498, Refs. p.493-498.
DLC QC884.C59 1996

Lacustrine deposits, Marine deposits, Bottom sediment, Paleobotany, Plant ecology, Vegetation patterns, Palynology, Paleoclimatology, Global warming, United States, Canada

51-359

Volcanic record in ice cores for the past 2000 years.

Robock, A., Free, M.P., Climatic variations and forcing mechanisms of the last 2000 years. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.41. Edited by P.D. Jones, R.S. Bradley, and J. Jouzel, Berlin, Springer-Verlag, 1996, p.533-546, 23 refs.
DLC QC884.C59 1996

Ice cores, Ice composition, Ice dating, Volcanic ash, Global change, Paleoclimatology, Statistical analysis

Although it has been possible to construct a new index of global volcanism using ice core acidity and sulphate records for the period from 1850 to the present, for the 2000 year period there are fewer ice cores available, and dating problems become more serious, especially for antarctic cores. The authors have compared all the ice cores available for the past 2000 years with the Dust Veil Index (DVI) and the Volcanic Explosivity Index (VEI) for this period. An Ice core-Volcanic Index constructed for the period 453 A.D. to the present shows little agreement with the DVI or VEI. Except for a very few eruptions, the ice core record currently available is insufficient to delineate the climatic forcing by explosive volcanic eruptions before ca. 1200 for the Northern Hemisphere and before ca. 1850 for the Southern Hemisphere. Additional ice cores, however, combined with geological and biological information, should allow this to be done in the future. (Auth.)

51-360

Changes in trace gas concentrations during the last 2,000 years and more generally the Holocene.

Raynaud, D., Barnola, J.M., Chappellaz, J., Martinerie, P., Climatic variations and forcing mechanisms of the last 2000 years. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.41. Edited by P.D. Jones, R.S. Bradley, and J. Jouzel, Berlin, Springer-Verlag, 1996, p.547-561, 25 refs.
DLC QC884.C59 1996

Atmospheric composition, Air pollution, Ice air interface, Ice cores, Ice composition, Gas inclusions, Global warming, Paleoclimatology

One possible forcing factor of the climate variability observed over the last 2,000 years is changing radiatively active trace gas concentrations in the atmosphere. Direct measurements of atmospheric trace gas concentrations over the last few decades indicate increasing global trends for CO_2, CH_4, N_2O and various halocarbons (CFCs), due to anthropogenic activities. Knowledge of the evolution of atmospheric trace gases for older periods arises mainly from the analysis of the air trapped in polar ice. The documentation of the 2,000 yr record is uneven. A large effort concerns the CO_2 and CH_4 records over the last millennium, which indicate fluctuations of about 10 ppmv for CO_2 and 70 ppbv for CH_4. The CO_2 and CH_4 records extended to the Holocene period show significant variations (up to about 40 ppmv for CO_2 and 150 ppbv for CH_4). Estimates of the climatic impact of such CO_2 and CH_4 fluctuations are given. Data concerning other less documented greenhouse trace gases, like N_2O or tropospheric ozone (over about the last 100 years), are also reviewed. (Auth. mod.)

51-361

Temperature changes on long time and large spatial scales: inferences from instrumental and proxy records.

Diaz, H.F., Climatic variations and forcing mechanisms of the last 2000 years. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.41. Edited by P.D. Jones, R.S. Bradley, and J. Jouzel, Berlin, Springer-Verlag, 1996, p.585-601, 28 refs.
DLC QC884.C59 1996

Atmospheric circulation, Air water interactions, Air temperature, Surface temperature, Global warming, Paleoclimatology, Statistical analysis

51-362

Are there optimum sites for global paleotemperature reconstruction.

Bradley, R.S., Climatic variations and forcing mechanisms of the last 2000 years. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.41. Edited by P.D. Jones, R.S. Bradley, and J. Jouzel, Berlin, Springer-Verlag, 1996, p.603-624, 8 refs.
DLC QC884.C59 1996

Atmospheric circulation, Air water interactions, Ice cores, Forest lines, Meteorological data, Paleoclimatology, Global warming, Computerized simulation, Statistical analysis

51-363

What can the instrumental record tell us about longer timescale paleoclimatic reconstructions?

Jones, P.D., Briffa, K.R., Climatic variations and forcing mechanisms of the last 2000 years. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.41. Edited by P.D. Jones, R.S. Bradley, and J. Jouzel, Berlin, Springer-Verlag, 1996, p.625-644, 20 refs.
DLC QC884.C59 1996

Atmospheric circulation, Meteorological data, Air temperature, Surface temperature, Ice cores, Paleoclimatology, Global change, Computerized simulation, Statistical analysis

Paleoclimatic data provide the only real estimates of past climatic variability on a decadal-to-century timescale for the last few millenia. Here the authors consider, through analyses of the instrumental data, how many evenly-spaced reconstructions would be required to estimate continental and hemispheric-scale average temperatures. The number required depends on the timescale of interest, with fewer required the longer the timescale. The ability of paleoclimatic reconstructions to record faithfully the course of climate variability similarly on all timescales is briefly considered. Data from both polar regions are cited. (Auth.)

51-364

Study of ice formations and their effect on bridges.

McClure, G.S., Jr., Herman, G.J., Helena, Montana State Highway Commission, Apr. 1965, 139p., 41 refs.

River ice, Ice formation, Ice breakup, Ice jams, Ice loads, Ice pressure, Ice friction, Ice solid interface, Ice control, Flood control, Bridges, Piers

51-365

Cold regions environmental modeling for Distributed Interactive Simulation.

Fiori, J.E., Davis, R.E., Koenig, G.G., Henson, J., Bates, R.E., MP 3902, Workshop on Standards for the Interoperability of Distributed Simulations, 13th DIS (Distributed Interactive Simulation), Orlando, Sep. 18-22, 1995. Vol.1. Position papers, Orlando, University of Central Florida, Institute for Simulation and Training, 1995, p.79-83, 15 refs.

Military operation, Cold weather operation, Military research, Snow cover effect, Infrared reconnaissance, Radar tracking, Terrain identification, Environment simulation, Computerized simulation, Data processing

A demonstration has been developed to show high fidelity Environmental Effects (EE) and their dynamics related to seeker performance and surveillance. Spatially distributed model results from a 72 hour period over snow cover and thaw conditions were animated. This model component was driven by meteorological measurements, which were used to calculate surface energy and mass budgets, material maps and Digital Terrain Elevation Data (DTED). Infrared (IR) and Millimeter Wave (MMW) signatures were predicted from output of the energy and mass transfer model, and were used to generate scenes from a similar perspective. These scenes were also animated. The IR and MMW scene animations demonstrate large temporal and spatial variations over relatively short time intervals and spatial scales on the order of meters. While the IR component of EE simulations is currently physically based, the MMW component relies on an expert system consisting of a hybrid physical-empirical model. Physically-based MMW modules are currently under development. Because of constraints on computing outlay required for these predictions in real time, the authors propose conceptual methods to pass Protocol Data Units (PDUs) describing EE to Distributed Interactive Simulations (DIS). This concept is based on the client-server model, where PDUs are drawn by an expert system from precalculated data, based on attributes passed in from other DIS servers.

51-366

Winter in Distributed Interactive Simulation.

Johnston, D.J., Bates, R.E., MP 3903, Workshop on Standards for the Interoperability of Distributed Simulations, 12th DIS (Distributed Interactive Simulation), Orlando, Mar. 13-17, 1995. Vol.1. Position papers, Orlando, University of Central Florida, Institute for Simulation and Training, 1995, p.119-127, 2 refs.

Military operation, Cold weather operation, Military research, Environment simulation, Computerized simulation

This paper reports on a study that was conducted to define winter requirements for Distributed Interactive Simulation (DIS). The objective was accomplished by enumerating a set of environmental features and embedded processes that uniquely define winter conditions; identifying factors that affect the performance of simulated battlefield functions; and by describing how winter conditions influence those factors. The study used TRADOC Pamphlet 11-9, *Blueprint of the Battlefield*, as its starting point to identify battlefield functions that are performed in the tactical level of war, are likely to be simulated in DIS, and are directly subject to winter conditions. It then associated these functions with battlefield tasks which are critical to their performance, and identified factors that affect those tasks. It then described how the environmental features and embedded process which are unique to the winter environment influence these factors. The results are intended to provide guidance to workshop attendees who are considering architectural enhancements to the DIS standard, and to developers, who are implementing dynamic environmental effects in DIS applications.

51-367

Are paleoclimate estimates biased by foliar physiognomic responses to increased atmospheric CO_2?

Gregory, K.M., *Paleogeography, palaeoclimatology, palaeoecology,* Aug. 1996, 124(1-2), p.39-51, Refs. p.49-51.

Paleobotany, Trees (plants), Paleoecology, Paleoclimatology, Carbon dioxide, Plant tissues, Plant physiology, Structural analysis, Phenology, Microclimatology

51-368

Fake waves break the ice in winter.

Hindley, M., *New scientist,* Aug. 17, 1996, 151(2034), p.23.

Ports, Freezeup, Sea water freezing, Ice control, Ice prevention, Water waves, Hydrodynamics, Turbulent exchange, Ice water interface, Machinery

51-369

Stratigraphy and paleomagnetism of a 3-km-thick Miocene lava pile in the Mjoifjördur area, eastern Iceland.

Kristjansson, L., Gudmundsson, A., Haraldsson, H., *Geologische Rundschau,* Dec. 1995, 84(4), p.813-830, 23 refs.

Geological maps, Geological surveys, Earth crust, Pleistocene, Subarctic landscapes, Geomagnetism, Magma, Stratigraphy, Profiles, Remanent magnetism, Geochronology, Iceland

51-370

Phase behaviors of supercooled water: reconciling a critical point of amorphous ices with spinodal instability.

Tanaka, H., *Journal of chemical physics,* Sep. 22, 1996, 105(12), p.5099-5111, 54 refs.

Ice physics, Amorphous ice, Supercooling, Liquid cooling, Water structure, Phase transformations, Thermodynamic properties, Molecular energy levels, Simulation, Liquid phases

51-371

Arctic terrain research 1959.

U.S. Air Force Cambridge Research Center. Geophysics Research Directorate, 1960, 24p., Refs. passim.

Ice islands, Drift stations, Ice shelves, Frozen lakes, Ice surveys, Ice cover strength, Topographic surveys, Site surveys, Ice runways, Aircraft landing areas

51-372

Arctic terrain research.

U.S. Air Force Cambridge Research Center. Geophysics Research Directorate, 1958, 26p., Refs. passim.

Ice surveys, Frozen lakes, Lake ice, Ice shelves, Ice cover strength, Ice islands, Ice runways, Site surveys, Topographic surveys, Aircraft landing areas

51-373

Report on Operation Groundhog (1958) North Greenland: investigation of ice-free sites for aircraft landings at Polaris Promontory, North Greenland.

Davies, W.E., Needleman, S.M., Klick, D.W., *U.S. Air Force Cambridge Research Center. Geophysics Research Directorate. Report,* Jan. 1959, 45p., 12 refs.

Aircraft landing areas, Site surveys, Topographic surveys, Soil trafficability, Greenland

51-374

Some features of arctic deep-sea sedimentation.

Hunkins, K.L., *U.S. Air Force Cambridge Research Center. Geophysics Research Directorate. GRD research notes,* Dec. 1959, No.29, Annual Arctic Planning Session, 2nd, Oct. 1959. Proceedings. Edited by V.C. Bushnell, p.11-15.

Ice islands, Drift stations, Ice rafting, Marine geology, Marine deposits, Bottom sediment, Drill core analysis, Paleoclimatology

51-375

Oceanographic and geophysical investigations at arctic drifting Station Charlie.

Cromie, W.J., *U.S. Air Force Cambridge Research Center. Geophysics Research Directorate. GRD research notes,* Dec. 1959, No.29, Annual Arctic Planning Session, 2nd, Oct. 1959. Proceedings. Edited by V.C. Bushnell, p.16-21.

Ice islands, Drift stations, Oceanographic surveys, Geophysical surveys, Marine geology, Marine deposits, Marine biology, Bottom sediment

51-376

Geophysical investigations at Fletcher's Ice Island, T-3.

Keller, G.V., Plouff, D., *U.S. Air Force Cambridge Research Center. Geophysics Research Directorate. GRD research notes,* Dec. 1959, No.29, Annual Arctic Planning Session, 2nd, Oct. 1959. Proceedings. Edited by V.C. Bushnell, p.22-25.

Ice islands, Drift stations, Drift, Ice cover thickness, Seismic surveys, Gravimetric prospecting, Sounding

51-377

Studies of micrometeorology at Fletcher's Ice Island, T-3.

Larsson, P., *U.S. Air Force Cambridge Research Center. Geophysics Research Directorate. GRD research notes,* Dec. 1959, No.29, Annual Arctic Planning Session, 2nd, Oct. 1959. Proceedings. Edited by V.C. Bushnell, p.26-31.

Ice islands, Drift stations, Air temperature, Snow air interface, Snow surface temperature, Ice temperature, Anemometers, Meteorological instruments

51-378

Oceanographic observations at Ice Island T-3, summer of 1959.

Kusunoki, K., *U.S. Air Force Cambridge Research Center. Geophysics Research Directorate. GRD research notes,* Dec. 1959, No.29, Annual Arctic Planning Session, 2nd, Oct. 1959. Proceedings. Edited by V.C. Bushnell, p.32-38.

Ice islands, Drift stations, Oceanographic surveys, Water temperature, Salinity

51-379

Build-up of thick floating ice in arctic areas.

Crary, A.P., *U.S. Air Force Cambridge Research Center. Geophysics Research Directorate. GRD research notes,* Dec. 1959, No.29, Annual Arctic Planning Session, 2nd, Oct. 1959. Proceedings. Edited by V.C. Bushnell, p.39-42.

Ice islands, Ice shelves, Ice formation, Ice growth, Ice heat flux, Ice cover thickness, Ice dating, Canada—Northwest Territories—Ellesmere Island

51-380

Ice-free land program.

Needleman, S.M., *U.S. Air Force Cambridge Research Center. Geophysics Research Directorate. GRD research notes,* Dec. 1959, No.29, Annual Arctic Planning Session, 2nd, Oct. 1959. Proceedings. Edited by V.C. Bushnell, p.46-50.

Aircraft landing areas, Site surveys, Aerial surveys, Topographic surveys, Terrain identification, Greenland

51-381

Geologic investigations.

Davies, W.E., *U.S. Air Force Cambridge Research Center. Geophysics Research Directorate. GRD research notes,* Dec. 1959, No.29, Annual Arctic Planning Session, 2nd, Oct. 1959. Proceedings. Edited by V.C. Bushnell, p.51-54.

Aircraft landing areas, Site surveys, Topographic surveys, Soil trafficability, Greenland

51-382

Engineering aspects and soils investigations.

Klick, D.W., *U.S. Air Force Cambridge Research Center. Geophysics Research Directorate. GRD research notes,* Dec. 1959, No.29, Annual Arctic Planning Session, 2nd, Oct. 1959. Proceedings. Edited by V.C. Bushnell, p.55-60.

Aircraft landing areas, Site surveys, Soil trafficability, Greenland

51-383

Groundhog 1959—East Greenland.

Hartshorn, J.H., *U.S. Air Force Cambridge Research Center. Geophysics Research Directorate. GRD research notes,* Dec. 1959, No.29, Annual Arctic Planning Session, 2nd, Oct. 1959. Proceedings. Edited by V.C. Bushnell, p.61-67.

Aircraft landing areas, Site surveys, Topographic surveys, Soil trafficability, Greenland

51-384

Investigations in the Storelv area, East Greenland.

Stoertz, G.E., *U.S. Air Force Cambridge Research Center. Geophysics Research Directorate. GRD research notes,* Dec. 1959, No.29, Annual Arctic Planning Session, 2nd, Oct. 1959. Proceedings. Edited by V.C. Bushnell, p.68-76.

Aircraft landing areas, Site surveys, Topographic surveys, Greenland

51-385

Ellesmere Ice Shelf investigations.

Anderson, D.G., *U.S. Air Force Cambridge Research Center. Geophysics Research Directorate. GRD research notes,* Dec. 1959, No.29, Annual Arctic Planning Session, 2nd, Oct. 1959. Proceedings. Edited by V.C. Bushnell, p.78-86.

Ice shelves, Glacier surveys, Snow ice interface, Glacial hydrology, Glacier ablation, Glacier melting, Canada—Northwest Territories—Ellesmere Island

51-386

Ellesmere Island Ice Shelf meteorological program.

Lotz, J.R., *U.S. Air Force Cambridge Research Center. Geophysics Research Directorate. GRD research notes,* Dec. 1959, No.29, Annual Arctic Planning Session, 2nd, Oct. 1959. Proceedings. Edited by V.C. Bushnell, p.87-91.

Ice shelves, Glacial meteorology, Marine meteorology, Weather stations, Canada—Northwest Territories—Ellesmere Island

51-387

Climatic observations during spring and early summer 1959, Lake Peters, Alaska.

Rock, C., *U.S. Air Force Cambridge Research Center. Geophysics Research Directorate. GRD research notes,* Dec. 1959, No.29, Annual Arctic Planning Session, 2nd, Oct. 1959. Proceedings. Edited by V.C. Bushnell, p.95-97.

Lake ice, Weather observations, Meteorological data, Air temperature, United States—Alaska—Brooks Range

51-388

Thermal studies on lakes Peters and Schrader, Alaska.

Hobbie, J.E., *U.S. Air Force Cambridge Research Center. Geophysics Research Directorate. GRD research notes,* Dec. 1959, No.29, Annual Arctic Planning Session, 2nd, Oct. 1959. Proceedings. Edited by V.C. Bushnell, p.98-101, 4 refs.

Glacial lakes, Lake ice, Ice melting, Lake water, Water temperature, Limnology, Thermal regime, United States—Alaska—Brooks Range

51-389

Preliminary report on Lake Peters, Alaska: ice studies.

Barnes, D.F., *U.S. Air Force Cambridge Research Center. Geophysics Research Directorate. GRD research notes,* Dec. 1959, No.29, Annual Arctic Planning Session, 2nd, Oct. 1959. Proceedings. Edited by V.C. Bushnell, p.102-110, 7 refs.

Frozen lakes, Lake ice, Ice surveys, Ice cover thickness, Ice cover strength, Ice deterioration, Ice runways, United States—Alaska—Brooks Range

51-390

Preliminary progress report: arctic coast geological investigations 1959.

Lewis, C.R., *U.S. Air Force Cambridge Research Center. Geophysics Research Directorate. GRD research notes,* Dec. 1959, No.29, Annual Arctic Planning Session, 2nd, Oct. 1959. Proceedings. Edited by V.C. Bushnell, p.111-114.

Geological surveys, Glaciation, Glacial geology, Glacial deposits, United States—Alaska—North Slope

51-391

Utilization of ice and snow for arctic operations (preliminary report).

Kingery, W.D., *U.S. Air Force Cambridge Research Center. Geophysics Research Directorate. GRD research notes,* Dec. 1959, No.29, Annual Arctic Planning Session, 2nd, Oct. 1959. Proceedings. Edited by V.C. Bushnell, p.117-121, 2 refs.

Ice (construction material), Ice strength, Snow (construction material), Snow compaction, Snow strength, Cold weather construction

51-392

Physical properties of snow and sea ice.

Anderson, D.L., *U.S. Air Force Cambridge Research Center. Geophysics Research Directorate. GRD research notes,* Dec. 1959, No.29, Annual Arctic Planning Session, 2nd, Oct. 1959. Proceedings. Edited by V.C. Bushnell, p.136-140, 7 refs.

Ice cover strength, Ice density, Ice elasticity

51-393

Crystallographic orientation of lake and artificial ice.

Lyons, J.B., Stoiber, R.E., *U.S. Air Force Cambridge Research Center. Geophysics Research Directorate. GRD research notes,* Dec. 1959, No.29, Annual Arctic Planning Session, 2nd, Oct. 1959. Proceedings. Edited by V.C. Bushnell, p.141-151, 8 refs. For another version see 15-18584.

Lake ice, Artificial ice, Ice crystal growth, Ice crystal structure, Ice crystal optics, Ice structure, Ice cover strength, Ice deterioration

51-394

Foam protection and preservation of arctic ice airstrips.

Grove, C.S., Jr., Walker, E.J., *U.S. Air Force Cambridge Research Center. Geophysics Research Directorate. GRD research notes,* Dec. 1959, No.29, Annual Arctic Planning Session, 2nd, Oct. 1959. Proceedings. Edited by V.C. Bushnell, p.152-153.

Ice runways, Thermal insulation, Cellular plastics, Protective coatings

51-395

C-130 as a support aircraft.

Douthit, T.D.N., *U.S. Air Force Cambridge Research Center. Geophysics Research Directorate. GRD research notes,* Dec. 1959, No.29, Annual Arctic Planning Session, 2nd, Oct. 1959. Proceedings. Edited by V.C. Bushnell, p.156-158.

Airplanes, Logistics, Ice runways, Skis

51-396

Whiteout phenomenon.

Quashnock, J.M., *U.S. Air Force Cambridge Research Center. Geophysics Research Directorate. GRD research notes,* Dec. 1959, No.29, Annual Arctic Planning Session, 2nd, Oct. 1959. Proceedings. Edited by V.C. Bushnell, p.159-162.

Whiteout, Snow optics, Visibility, Physiological effects, Safety

51-397

Neogene East Antarctic ice sheet: a dynamic or stable feature?

Wilson, G.S., *Quaternary Science Reviews,* 1995, Vol.14, p.101-123, Refs. p.119-123.

Ice sheets, Ice melting, Ice volume, Glacier oscillation, Glacial deposits, Marine geology, Glacial geology, Paleoclimatology, Global warming, Antarctica—East Antarctica

This paper is a review of the history and behavior of the East Antarctic ice sheet during the late Neogene. The antarctic ice sheet is a critical factor in the global climate and oceanographic system. Knowledge of its historical development is critical to understanding global palaeoceanographic and palaeoclimatic systems and their development. The 'Webb-Harwood hypothesis' proposes that the ice sheet, while being present in Antarctica for more than 40 Ma was until recently (ca. 2.5 Ma) a dynamic feature, waxing and waning under a more temperate climatic and glaciologic regime. The 'stabilistic hypothesis' proposes that the current ice sheet has existed in its present cold and polar form for at least the last 14 Ma. Several issues are highlighted here as important for direction of future research and discussion concerning Late Cenozoic antarctic glacio-climatic history. (Auth. mod.)

51-398

***Aurora Australis* construction gets under way.**

Bear, I., Betts, M., Boyer, P., Quilty, P., Heyward, P., *ANARE news,* Dec. 1988, p.3-8.

Ships, Research projects, Sea ice, Meetings

The report gives some of the details that led to the construction of this Australian antarctic research vessel. It includes a joining of ideas from all branches of the Antarctic Division, proposals from over 100 world-wide agencies, contract negotiations in 1987, the completion of design details by a Finnish ship builder, and the selection of an Australian shipyard to construct the vessel with the technical assistance from the design company. Science and resupply are the basic uses for the vessel and equipment and instruments to meet these needs are provided; a high ice classification is an obvious necessity; details of specific scientific instrumentation are provided. Brief news reports are included: an outline of the Australian antarctic science program; voyage 1 in *Icebird* in which the dominant theme was the use of aircraft in Antarctica; the Force-12 storm that destroyed four helicopters aboard *Icebird*; brief accounts of the Proceedings of the XXth SCAR in Hobart and the 8th Antarctic Treaty Consultative Meeting in Paris.

51-399

Additional comments on the warming trend at Little America, Antarctica.

Wexler, H., *Weather,* Feb. 1961, 16(2), p.56-58, 3 refs.

Air temperature, Climatic changes, Antarctica—Ross Ice Shelf, Antarctica—Little America Station

It is the purpose of this note to include the additional year of 1958 in the trend study, to correct some of the previous data and to derive a trend based on smaller, but more comparable periods in each of the years. With regard to the latter point, difficulties arose when observations were taken aboard ships moored off-shore (Feb. and Mar. 1911, Jan. and Feb. 1929) and during Feb. 1934, when the first nine days were missing. These incomplete years can be studied by using nearly comparable 10-month periods omitting Feb. and Mar. of each year, to compute a second trend and by using strictly comparable 9-month periods, Apr. to Dec., to compute a third trend.

51-400

Barents Sea Polar Front in summer.

Parsons, A.R., et al, *Journal of geophysical research,* June 15, 1996, 101(C6), p.14,201-14,221, 40 refs.

Sea water, Salinity, Tides, Ocean currents, Water temperature, Hydrography, Barents Sea

51-401

Antarctic map from the Geosat Radar Altimeter Geodetic Mission.

Mantripp, D.R., Ridley, J.K., Rapley, C.G., *Earth observation quarterly,* May-June 1992, Nos.37-38, p.6-10, 20 refs.

Glaciology, Mapping, Ice sheets, Ice shelves, Topographic surveys, Radar, Antarctica—Adélie Coast, Antarctica—Wilkins Ice Shelf

A unique view of Antarctica derived from the US Navy's Geosat Radar Altimeter Geodetic Mission is presented. Height measurements gathered during 1985-86 have been used to produce a shadow image for the area of the continent north of 72°S (Geosat's latitude limit). The Geodetic Mission provided a very dense ground-track spacing corresponding to ca. 2 km at the antarctic coastline. In spite of problems with surface tracking, especially on the steeper and more rugged parts of the ice sheet close to the coast, the altimeter obtained some 2,100,000 antarctic height estimates. When compiled as a shadow map, the data reveal considerable topographic detail both on the ice sheet plateaus and on the floating ice shelves. The features visible are of considerable interest for the study of antarctic glaciology, and confirm the value of satellite radar altimeters to antarctic research. The results emphasize the need for altimeter missions with dense ground-track spacings and high-latitude coverage in the future. (Auth.)

51-402

Shipborne radar backscatter measurements from arctic sea ice during the fall freeze-up.

Beaven, S.G., Gogineni, S.P., *Remote sensing reviews,* 1994, Vol.9, p.3-25, 34 refs.

Oceanography, Sea ice, Ice surveys, Remote sensing, Freezeup, Surface structure, Radar echoes, Backscattering, Seasonal freeze thaw, Regelation, Data processing, Temperature effects, Arctic Ocean

51-403

Scattering from a volume of *N*-spheres with application to backscattering from snow.

Tzeng, Y.C., Tjuatja, S., Fung, A.K., *Remote sensing reviews,* 1994, Vol.9, p.65-75, 16 refs.

Remote sensing, Snow surveys, Snow cover structure, Snow optics, Microwaves, Backscattering, Polarization (waves), Analysis (mathematics)

51-404

Influence of freezing and thawing on the carbon isotope composition in soil CO_2.

Dudziak, A., Halas, S., *Geoderma,* Feb. 1996, 69(3-4), p.209-216, 24 refs.

Soil freezing, Frozen ground chemistry, Frozen ground physics, Permeability, Vapor diffusion, Geochemical cycles, Carbon dioxide, Freeze thaw cycles, Carbon isotopes, Isotope analysis, Snow cover effect

51-405

Establishing the chronology of snow and pollen deposition events on Agassiz Ice Cap (Ellesmere Island, Northwest Territories) from autostation records.

Alt, B.T., Bourgeois, J.C., *Canada. Geological Survey. Current research, pt.B,* 1995, p.71-79, With French summary. 14 refs.

Climatology, Tundra climate, Precipitation (meteorology), Atmospheric circulation, Ice sheets, Snow accumulation, Snow air interface, Palynology, Aerosols, Sedimentation, Snow composition, Stratification, Boreholes, Correlation, Age determination, Canada—Northwest Territories—Agassiz Ice Cap

51-406

Sea ice.

Ackley, S.F., MP 3904, Encyclopedia of Applied Physics. Vol.17, New York, VCH Publishers, Inc., [1996], p.81-103, 15 refs.

Sea ice, Ice structure, Ice formation, Physical properties, Ice water interface, Air ice water interaction, Ice cover effect, Ice heat flux, Marine biology, Climatic factors

The properties of sea ice are sensitive to the growth conditions and, after formation of the initial ice cover, its thermal and dynamic history. These conditions are both spatially and temporally variable, leading to significant differences in sea-ice behavior from location to location and season to season. The theme of this entry is to develop the relationship between these processes and the resulting ice properties and ice distribution, and then review how the sea ice interacts with the geophysical and biological environments. (Auth. mod.)

51-407

Validation of Weertman's theory of basal moraine formation by bottom freezing beneath polar ice sheets.

Gow, A.J., MP 3905, Johannes Weertman Symposium. Edited by R.J. Arsenault et al, 1995, p.331-335, 14 refs.

Glacial geology, Ice sheets, Sedimentation, Stratigraphy, Bottom ice, Meltwater, Regelation, Moraines, Ice solid interface, Drill core analysis, Isotope analysis, Theories

Weertman postulated on theoretical grounds that wet-bottomed ice sheets could, by refreezing of basal meltwater generated by geothermal and frictional heating, incorporate debris from the underlying bed. This "freeze-in" of basal moraine was offered as an alternative mechanism to that of "shearing-in" to explain the origin of so-called shear moraines at the margin of the Greenland Ice Sheet. A viable test of Weertman's "freeze-in" hypothesis came several years later with the successful drilling to bedrock of the Antarctic Ice Sheet at Byrd Station. The nature and disposition of this basal moraine, together with stable isotope and entrapped gas analyses of the enclosing ice, are consistent only with a "freeze-in" mechanism as first postulated by Weertman. Formation of debris-laden ice in cores from the bottom of the Greenland Ice Sheet at Camp Century has also been attributed to freeze-in of bed sediment, further reinforcing the notion that it is likely the predominant mechanism of basal moraine formation in ice sheets at their pressure melting points. (Auth. mod.)

51-408

Temporal and spatial fluctuations in ground cover surface temperature at a northern New England site.

Peck, L., MP 3906, *Atmospheric research,* 1996, Vol.41, p.131-160, 22 refs.

Climatology, Surface temperature, Soil air interface, Temperature measurement, Radiometry, Heat flux, Albedo, Radiance, Upwelling, Snow cover effect, Vegetation factors, Seasonal variations, Diurnal variations

Ground cover surface temperature at a field site in South Royalton, VT, is calculated from 30-minute averages of upwelling longwave (3-50 μm) radiation measured with a pyrgeometer, resulting in 48 estimations of surface temperature each day. The ground covers are a seasonal sequence of (1) dormant grass prior to snowfall, (2) snow cover, (3) an irregular distribution of thatch, exposed soil and new-growth grass following final snowmelt and (4) lush, continuous grass cover. Diurnal variation in ground cover surface temperature and also seasonal differences in temperature spread and rate of tempera-

ture change are evident. An indication of relative spatial uniformity of surface temperature for these ground covers is obtained by monitoring the surface with a second instrument, a passive infrared sensor system that responds to differential changes in thermal radiance from the ground cover. The snow cover is a thermally uniform background (on the scale of field of view of the passive infrared sensor system), and the grass-thatch-soil is thermally the most diverse, while the lush grass is thermally heterogeneous when sunlit grass blades blow in the wind. The use of such a passive system provides information on the variability of ground cover surface temperature, and by implication, on changes in radiant-energy loading and heat exchange processes, on a spatial scale larger than that of a standard ground-based pyrgeometer. (Auth. mod.)

51-409

Antarctic Zone Flux Experiment.

McPhee, M.G., Ackley, S.F., MP 3907, *American Meteorological Society. Bulletin,* June 1996, 77(6), p.1221-1232, 39 refs.

Climatology, Oceanographic surveys, Air ice water interaction, Sea ice distribution, Heat transfer, Turbulent exchange, Turbulent boundary layer, Ice heat flux, Ice cover effect, Sounding, Drift stations, Wind factors, Antarctica—Weddell Sea

Understanding what environmental conditions could again trigger widespread oceanic overturn may be an important key in determining the role of high latitudes in deep-ocean ventilation and global atmospheric warming. During the Antarctic Zone Flux Experiment in July and Aug. 1994, response of the Weddell Sea upper ocean and its ice cover to a series of storms was measured at two drifting stations supported by the National Science Foundation research icebreaker *Nathaniel B. Palmer.* This article describes the experiment, in which fluxes of heat, mass and momentum were measured in the upper ocean, sea ice and lower-atmospheric boundary layer. Initial results illustrate the importance of oceanic heat flux at the ice undersurface for determining the character of the sea ice cover. They also show how the heat flux depends both on high levels of turbulent mixing during intermittent storm events and on large variability in the stratified upper ocean below the mixed layer. (Auth. mod.)

51-410

Fracture of river ice covers by river waves.

Daly, S.F., MP 3908, *Journal of cold regions engineering,* Mar. 1995, 9(1), p.41-62, 26 refs.

River ice, Ice mechanics, Ice breakup, Flexural strength, Ice cover strength, Cracking (fracturing), Crack propagation, Wave propagation, Water waves, Ice water interface, Unsteady flow, Dynamic loads, Mathematical models, Wave propagation

The stresses induced in ice covers by river waves are investigated as a possible mechanism for causing transverse cracks during breakup. The maximum stress levels that river waves can cause in ice cover are determined over the entire spectrum of waves that may be present at breakup. The ice cover is analyzed as a continuous elastic plate. The calculations indicate that the celerities of propagating waves are always less than the celerity of free waves of the same wavelength and as a result, only the first maximum is possible. The global minimum wave amplitude required to cause cracks is therefore found at a wavelength of $2\pi l$. At this wavelength, a simple expression describing the minimum wave amplitude causing cracks can be derived.

51-411

Location of blue ice runway sites—report on air photo search.

Swithinbank, C., MP 3909, U.S. Army Cold Regions Research and Engineering Laboratory. CRREL project No.88-4a, Aug. 1988, n.p., 3 refs.

Cold weather construction, Runways, Geological surveys, Orientation, Site surveys, Photointerpretation, Oblique photography, Logistics, Glacier surfaces, Topographic features, Antarctica—Blackburn, Mount, Antarctica—Goodale, Mount

The author examined some 7,000 aerial photographs obtained for mapping purposes by the U.S. Navy for the U.S. Geological Survey in Antarctica between latitudes 84°S and 88°S, longitudes 160°E and 120°W. While thousands of km^2 of essentially snow-free bare ice are identifiable, most are unsuitable for large wheeled aircraft because of slope, grade change, length, crevasses, or obstructed approaches. However, all these factors were predictable and expected. The same problems were encountered in both areas where earlier (successful) searches were made for bare ice runways. Ice sheets and outlet glaciers are driven by gravity flow: slopes are normal and over many areas exceed reasonable criteria for transport aircraft. The only possible landing place where the surface is completely level is a frozen lake with dimensions of 1x4 km at 85° 25'S, 147° 40'W. This should be investigated. (Auth. mod.)

51-412

Quantitative description of sea ice inclusions.

Perovich, D.K., Gow, A.J., MP 3910, *Journal of geophysical research,* Aug. 15, 1996, 101(C8), p.18,327-18,343, 54 refs.

Oceanography, Sea ice, Ice physics, Physical properties, Ice microstructure, Porosity, Gas inclusions, Bubbles, Brines, Temperature effects, Statistical analysis, Thin sections, Ice optics

Photomicrographs of sea ice thin sections were analyzed using a personal computer-based image-processing system to determine the number of inclusions, the inclusion size distributions, and statistics for brine pockets in younger ice and first-year ice and for air bubbles in a multiyear hummock. Inclusions ranging in size from thousandths of mm^2 to a few mm^2 were measured. In all cases a two-parameter lognormal distribution fits the cumulative inclusion size distributions well (correlation coefficient greater than 0.99). Increase in brine pocket size is particularly pronounced for brine volumes greater than 10% as individual brine pockets coalesce. Air bubbles are much larger than brine pockets, with mean major axis lengths of the order of millimeters for air bubbles and tenths of a millimeter for brine pockets. Observations of inclusion shape factors indicate that, in general, brine pockets are more elongated than air bubbles.

51-413

Method for on-line determination of residual water content and sublimation end-point during freeze-drying.

Genin, N., Rene, F., Corrieu, G., *Chemical engineering and processing,* Aug. 1996, 35(4), p.255-263, 18 refs.

Freeze drying, Ice physics, Ice water interface, Vacuum freezing, Frozen liquids, Ice sublimation, Water content, Moisture transfer, Moisture detection, Mass transfer, Sensors

51-414

Overview of arctic cloud and radiation characteristics.

Curry, J.A., Rossow, W.B., Randall, D., Schramm, J.L., *Journal of climate,* Aug. 1996, 9(8), p.1731-1764, Refs. p.1758-1764.

Climatology, Polar atmospheres, Atmospheric boundary layer, Radiation balance, Cloud cover, Optical properties, Classifications, Sea ice distribution, Ice cover effect, Ice nuclei, Aerosols, Models

51-415

Effects of ice albedo and runoff feedbacks on the thermohaline circulation.

Nakamura, M., *Journal of climate,* Aug. 1996, 9(8), p.1783-1794, 46 refs.

Climatology, Climatic changes, Ocean currents, Salinity, Stability, Air ice water interaction, Ice cover effect, Insolation, Albedo, Moisture transfer, River flow, Runoff, Mathematical models, Simulation

51-416

Relationships between cloud type and amount, precipitation, and surface temperature in the Mackenzie River Valley-Beaufort Sea area.

Isaac, G.A., Stuart, R.A., *Journal of climate,* Aug. 1996, 9(8), p.1921-1941, 25 refs.

Climatology, Climatic factors, Polar atmospheres, Atmospheric density, Surface temperature, Precipitation (meteorology), Cloud cover, Classifications, Indexes (ratios), Models, Beaufort Sea, Canada—Northwest Territories—Mackenzie River

51-417

Hydrological and microbiological factors affecting persistence and migration of petroleum hydrocarbons spilled in a continuous-permafrost region.

Braddock, J.F., McCarthy, K.A., *Environmental science & technology,* Aug. 1996, 30(8), p.2626-2633, 39 refs.

Arctic landscapes, Continuous permafrost, Soil pollution, Permafrost hydrology, Soil microbiology, Ground water, Water flow, Subsurface drainage, Soil water migration, Environmental protection, Chemical analysis, Sampling, Countermeasures

51-418

Ships for the conquest of the North Pole. [Les navires a la conquete du Pole Nord geographique]

Imbert, B., *Navigation,* July 1995, 43(171), p.398-411, In French with English summary.

Oceanography, Sea ice distribution, Ice surveys, Drift, Drift stations, Exploration, Icebreakers, Submarines, Arctic Ocean

51-419

Production of dense overflow waters feeding the North Atlantic across the Greenland-Scotland Ridge. Part 1: Evidence for a revised circulation scheme.

Mauritzen, C., *Deep-sea research I,* June 1996, 43(6), p.769-806, 66 refs.

Oceanography, Ocean currents, Water transport, Hydrography, Advection, Turbulent diffusion, Bottom topography, Topographic effects, Norwegian Sea

51-420

Production of dense overflow waters feeding the North Atlantic across the Greenland-Scotland Ridge. Part 2: An inverse model.

Mauritzen, C., *Deep-sea research I,* June 1996, 43(6), p.807-835, 54 refs.

Oceanography, Ocean currents, Water transport, Hydrography, Mass transfer, Turbulent diffusion, Seasonal variations, Mathematical models, Sea water freezing, Ice melting, Wind factors, Air ice water interaction, Statistical analysis, Arctic Ocean, Greenland Sea

51-421

Nitrogen saturation in the Rocky Mountains.

Williams, M.W., Baron, J.S., Caine, N., Sommerfeld, R., Sanford, R., Jr., *Environmental science & technology,* Feb. 1996, 30(2), p.640-646, 45 refs.

Alpine landscapes, Aerosols, Ecosystems, Hydrologic cycle, Stream flow, Snow hydrology, Snowmelt, Ion diffusion, Ion density (concentration), Geochemical cycles, Sampling, Environmental tests, United States—Colorado—Niwot Ridge

51-422

Mayday!

Hill, C., *Weatherwise,* June-July 1996, 49(3), p.25-28.

Weather observations, Precipitation (meteorology), Thunderstorms, Hail, Damage, Safety, Cost analysis

51-423

Water, ice, and meteorological measurements at South Cascade Glacier, Washington, 1995 balance year.

Krimmel, R.M., U.S. Geological Survey. Water-resources investigation report. No.96-4174, Tacoma, 1996, 37p., 11 refs.

Glacial hydrology, Glacier surveys, Glacier mass balance, Glacial meteorology, Snow accumulation, Ice melting, Runoff, Seasonal variations, Meteorological factors, United States—Washington—South Cascade Glacier

51-424

Teaching geohydrology through analysis of ground-water resources and glacial geology in northwestern Vermont.

Clapp, E.M., Bierman, P.R., Church, A.B., Larsen, P.L., Schuck, R.A., Hanzas, J.P., Jr., *Journal of geoscience education,* Jan. 1996, 44(1), p.45-52, 11 refs.

Education, Glacial geology, Geological surveys, Hydrogeology, Water supply, Ground water, Water transport, Well logging, Bedrock, Computer programs, United States—Vermont

51-425

Seasonal changes and relations between levels of organochlorines in arctic ambient air: first results of an all-year-round monitoring program at Ny-Ålesund, Svalbard, Norway.

Oehme, M., Haugen, J.E., Schlabach, M., *Environmental science and technology,* July 1996, 30(7), p.2294-2304, 27 refs.

Polar atmospheres, Climatology, Air pollution, Atmospheric composition, Atmospheric circulation, Mass transfer, Sampling, Aerosols, Origin, Seasonal variations, Environmental tests, Norway—Svalbard

51-426

Unidirectional freezing of waste-activated sludges: effects of freezing speed.

Hung, W.T., Chang, I.L., Lin, W.W., Lee, D.J., *Environmental science and technology,* July 1996, 30(7), p.2391-2396, 39 refs.

Sewage treatment, Waste disposal, Sludges, Freeze thaw cycles, Freeze thaw tests, Ice water interface, Velocity, Turbidity, Capillarity, Hygroscopic water, Geochemistry, Low temperature tests

51-427

Modification of snowmelt chemistry by forest floor and mineral soil, northern Michigan.

Stottlemyer, R., Toczydlowski, D., *Journal of environmental quality,* July-Aug. 1996, 25(4), p.828-836, 35 refs.

Watersheds, Snow hydrology, Stream flow, Snowmelt, Leaching, Solubility, Forest soils, Snow composition, Organic nuclei, Ion density (concentration), Hydrogeochemistry, Sampling, United States—Michigan

51-428

Petrophysical characteristics of shale from the Beaufort-Mackenzie Basin, northern Canada: permeability, formation factor, and porosity versus pressure.

Katsube, T.J., Issler, D.R., Coyner, K., Canada. Geological Survey. Current Research, Part B. Interior Plains and Arctic Canada, Ottawa, 1996, p.45-50, With French summary. 17 refs.

Geological surveys, Lithology, Subarctic landscapes, Earth crust, Structural analysis, Sedimentation, Porosity, Permeability, Drill core analysis, Compaction, Vapor pressure, Canada—Northwest Territories—Mackenzie Basin

51-429

Early land plants from the Late Silurian-Early Devonian of Bathurst Island, Canadian Arctic Archipelago.

Basinger, J.F., Kotyk, M.E., Gensel, P.G., Canada. Geological Survey. Current Research, Part B. Interior Plains and Arctic Canada, Ottawa, 1996, p.51-60, With French summary. 17 refs.

Arctic landscapes, Pleistocene, Geological surveys, Paleoecology, Fossils, Classifications, Vegetation patterns, Stratigraphy, Canada—Northwest Territories—Bathurst Island

51-430

Surficial geology and sea level history of Bathurst Island, Northwest Territories.

Bednarski, J.M., Canada. Geological Survey. Current Research, Part B. Interior Plains and Arctic Canada, Ottawa, 1996, p.61-66, With French summary. 17 refs.

Arctic landscapes, Glacial geology, Glacier oscillation, Marine geology, Geomorphology, Geological surveys, Geological maps, Quaternary deposits, Isostasy, Sea level, Canada—Northwest Territories—Bathurst Island

51-431

C-band radar signatures of lithology in arctic environments: preliminary results from Bathurst Island, Northwest Territories.

Budkewitsch, P., D'Iorio, M.A., Harrison, J.C., Canada. Geological Survey. Current Research, Part B. Interior Plains and Arctic Canada, Ottawa, 1996, p.67-72, With French summary. 23 refs.

Arctic landscapes, Lithology, Surface structure, Geological surveys, Remote sensing, Airborne radar, Synthetic aperture radar, Radar echoes, Sensor mapping, Backscattering, Topographic effects, Surface roughness, Canada—Northwest Territories—Bathurst Island

51-432

Regional gravity survey of Ellesmere and Axel Heiberg islands, Northwest Territories.

Hearty, D.B., Seemann, D.A., Maye, P., Jackson, R., Canada. Geological Survey. Current Research, Part B. Interior Plains and Arctic Canada, Ottawa, 1996, p.73-79, With French summary. 3 refs.

Arctic landscapes, Geodetic surveys, Aerial surveys, Geologic structures, Tectonics, Gravity, Geological maps, Canada—Northwest Territories—Ellesmere Island, Canada—Northwest Territories—Axel Heiberg Island

51-433

New showings and new geological settings for mineral exploration in the Arctic islands.

Harrison, J.C., De Freitas, T., Canada. Geological Survey. Current Research, Part B. Interior Plains and Arctic Canada, Ottawa, 1996, p.81-91, With French summary. 29 refs.

Arctic landscapes, Geological surveys, Sedimentation, Bedrock, Stratigraphy, Geochemistry, Minerals, Exploration, Canada—Northwest Territories—Bathurst Island, Canada—Northwest Territories—Cornwallis Island

51-434

Glacial facies associations in a Neoproterozoic back-arc setting, Zavkhan Basin, western Mongolia.

Lindsay, J.F., Brasier, M.D., Shields, G., Khomentovskiĭ, V.V., Bat-Ireedui, Y.A., *Geological magazine,* July 1996, 133(4), p.391-402, 33 refs.

Pleistocene, Glaciation, Glacial geology, Glacial deposits, Sedimentation, Isotope analysis, Stratigraphy, Carbon isotopes, Geochronology, Correlation, Mongolia

51-435

Survey of human factors in military performance in extreme cold weather.

Washburne, N.F., George Washington University. Human Resources Research Office. Research memorandum, Washington, D.C., June 1960, 46p., 125 refs.

Cold weather performance, Military operation, Human factors, Research projects, Education, Temperature effects, Climatic factors

51-436

Frost resistance of roller-compacted concrete.

Pigeon, M., Marchand, J., *Concrete international,* July 1996, 18(7), p.22-26, 28 refs.

Concrete strength, Concrete durability, Concrete aggregates, Compaction, Frost resistance, Freeze thaw cycles, Air entrainment, Porosity, Degradation

51-437

Permafrost microbiology.

Gilichinskiĭ, D.A., Wagener, S., Vishnevetskaia, T.A., *Permafrost and periglacial processes,* Oct.-Dec. 1995, 6(4), p.281-291, With French summary. 42 refs.

Permafrost structure, Geocryology, Soil microbiology, Cryobiology, Geochemistry, Ecosystems, Permafrost preservation, Extraterrestrial ice, Cold tolerance, Acclimatization

51-438

Laboratory simulation of periglacial solifluction: significance of porewater pressures, moisture contents and undrained shear strengths during soil thawing.

Harris, C., Davies, M.C.R., Coutard, J.P., *Permafrost and periglacial processes,* Oct.-Dec. 1995, 6(4), p.293-311, With French summary. 29 refs.

Geocryology, Periglacial processes, Solifluction, Slope processes, Frost heave, Ground thawing, Freeze thaw tests, Frozen ground mechanics, Mass transfer, Water pressure, Shear strength, Rheology, Simulation

51-439

Interannual variations of the thermal regime of the active layer and near-surface permafrost in northern Alaska.

Romanovsky, V.E., Osterkamp, T.E., *Permafrost and periglacial processes,* Oct.-Dec. 1995, 6(4), p.313-335, With French summary. 60 refs.

Geocryology, Soil air interface, Permafrost thermal properties, Frozen ground temperature, Thermal regime, Active layer, Thaw depth, Freezing points, Surface temperature, Temperature measurement, Climatic changes, Indexes (ratios), Seasonal variations, United States—Alaska

51-440

Geochemical paradox of ice-complex sediments in north Siberia.

Konishchev, V.N., Plakht, I.R., *Permafrost and periglacial processes,* Oct.-Dec. 1995, 6(4), p.337-343, With French summary. 11 refs.

Pleistocene, Geochemistry, Frozen ground chemistry, Diagenesis, Soil freezing, Permafrost structure, Sediments, Ground ice, Salinity, Climatic factors, Russia—Siberia

51-441

Rockslide processes on the north slope of Popocatepetl Volcano, Mexico.

Palacios, D., *Permafrost and periglacial processes,* Oct.-Dec. 1995, 6(4), p.345-359, With French summary. 43 refs.

Geomorphology, Periglacial processes, Mountain soils, Slope processes, Mass movements (geology), Volcanic ash, Rock streams, Snow accumulation, Snow cover effect, Ice solid interface, Topographic effects, Mexico—Popocatepetl

51-442

Observations on nearshore pingo growth, Adventdalen, Spitsbergen.

Yoshikawa, K., Harada, K., *Permafrost and periglacial processes,* Oct.-Dec. 1995, 6(4), p.361-372, With French summary. 19 refs.

Permafrost structure, Permafrost hydrology, Frozen ground mechanics, Pingos, Soil freezing, Frozen ground mechanics, Hydrogeochemistry, Geomorphology, Soil water migration, Norway—Spitsbergen

51-443

Field survey of late-summer depths to frozen ground at two study areas near Mayo, Yukon Territory, Canada.

Leverington, D., *Permafrost and periglacial processes,* Oct.-Dec. 1995, 6(4), p.373-379, With French summary. 21 refs.

Permafrost surveys, Geophysical surveys, Thaw depth, Seasonal variations, Active layer, Sensor mapping, Correlation, Canada—Yukon Territory—Mayo

51-444

Sensitivity of climate simulations to the specification of mixed phase clouds.

Gregory, D., Morris, D., *Climate dynamics,* July 1996, 12(9), p.641-651, 31 refs.

Climatology, Climatic changes, Cloud physics, Precipitation (meteorology), Radiation balance, Albedo, Phase transformations, Classifications, Water content, Ice formation, Ice water interface, Simulation, Temperature effects

51-445

Lead concentrations in lichens from the Canadian High Arctic in relation to the latitudinal pollution gradient.

France, R., Coquery, M., *Water, air, and soil pollution,* Aug. 1996, 90(3-4), p.469-474, 36 refs.

Polar atmospheres, Air pollution, Metals, Ion density (concentration), Aerosols, Spectroscopy, Plant ecology, Lichens, Environmental tests, Environmental impact, Sampling, Canada—Northwest Territories—Ellesmere Island

51-446

Mercury accumulation in transplanted moss and lichens at high elevation sites in Quebec.

Evans, C.A., Hutchinson, T.C., *Water, air, and soil pollution,* Aug. 1996, 90(3-4), p.475-488, 28 refs.

Plant ecology, Plant tissues, Lichens, Mosses, Air pollution, Metals, Aerosols, Sedimentation, Fog, Environmental impact, Environmental tests, Simulation, Statistical analysis, Canada—Quebec—Burt Lake

51-447

Can microfibers prevent frost damage.

Pigeon, M., Azzabi, M., Pleau, R., *Cement and concrete research,* Aug. 1996, 26(8), p.1163-1170, 7 refs.

Mortars, Cement admixtures, Frost resistance, Composite materials, Synthetic materials, Freeze thaw tests, Porosity, Degradation

51-448

Interpretation of simulated radar-altimetric waveforms: surfaces of constant elevation (sea-ice or flat land).

Novotny, E., *International journal of remote sensing,* Sep. 20, 1996, 17(14), p.2803-2825, 8 refs.

Remote sensing, Spacecraft, Radar echoes, Terrain identification, Sensor mapping, Backscattering, Wave propagation, Sea ice distribution, Vegetation patterns, Ice floes, Ice edge, Specular reflection, Data processing, Statistical analysis

51-449

Recent evolution of the overall radioactive levels in the ice of Livingston Island (Antarctica).

Baeza, A., Del Rio, L.M., Jiminez, A., Miro, C., Navarro, E., Paniagua, J.M., *Applied radiation and isotopes,* Aug. 1996, 47(8), p.811-819, 27 refs.

Glaciology, Glacier ice, Ice composition, Radioactive isotopes, Fallout, Isotope analysis, Snow cover effect, Sampling, Radioactive age determination, Stratification, Geochemistry, Antarctica—Livingston Island

A study of the physico-chemical characteristics of the different layers of ice to a depth of 8.32 m in the Hurd glacier was conducted on Livingston I. in the South Shetland archipelago. No dependence on depth was observed for the pH, dry residue, or the concentrations of Ca^{2+}, Mg^{2+}, and K^+ ions. The only dependence observed was a systematic increase in density from 0.5 to 0.85 g/cm^3 due to the greater compaction of the deeper layers. The mean annual mass balance was determined by two methods: localization of the ashes emitted by a volcano on Deception I. and by means of a ^{210}Pb dating method. The result in both cases was a value of 0.24 kg/m^2/yr, which allowed dating of different layers of ice sampled. The mean annual ^{210}Pb fallout was determined to be 1.9 Bq/m^2/yr. While no systematic variations in total β activity were observed with depth, they were observed for total α and residual β activities in the said ice layers. (Auth. mod.)

51-450

Lake Vostok—freshwater time capsule.

Williams, C., *Geotimes,* Sep. 1996, 41(9), p.6-7.

Limnology, Glacial hydrology, Lake ice, Subglacial observations, Boreholes, Ice cores, Paleoecology

Scientists conducting radio-echo surveys of ice depths over central East Antarctica in the 1970s discovered evidence of a huge subglacial, freshwater lake. Early estimates set the lake's dimensions at about 10,000 km^2. An international team of scientists led by A.P. Kapitsa (Moscow State University) recently revised those figures upward by almost 50%—to 14,000 km—and suggested new details about the bodies of water lying beneath Antarctica's frozen epidermis. Named for its proximity to Vostok Station, a Russian research base in East Antarctica about 1,200 km from the South Pole, Lake Vostok is comparable in size to Lake Ontario and in depth, perhaps even to Lake Baikal in Siberia. Researchers now theorize that the lake is part of a vast hydrological system of about 70 subglacial lakes in central Antarctica. Kapitsa and colleagues used radar altimetry and radio-echo studies, combined with old seismic data, to show that the water of Lake Vostok is virtually free of salts and reaches depths of at least 510 m, making it one of the world's 10 deepest lakes. Depending on the lake's deep circulation, the water may date back some 50,000 years. (Auth.)

51-451

Initiation of a continental ice sheet in a global climate model (GENESIS).

Otto-Bliesner, B.L., *Journal of geophysical research,* July 27, 1996, 101(D12), p.16,909-16,920, 52 refs.

Paleoclimatology, Climatic changes, Ice sheets, Hydrologic cycle, Glaciation, Snow depth, Snow cover distribution, Snow cover effect, Insolation, Simulation, Models

The initiation and maintenance of a continental ice sheet, including arctic and antarctic regions, are investigated using the GENESIS global climate model. A necessary condition for ice sheet initiation is to have snow cover survive through the summer. Model simulations examine the sensitivity of the maintenance of summer snow cover to the prescriptions of topography and solar luminosity. The time period chosen for this study is the Late Carboniferous (306 Ma) when an extensive continental ice sheet, as large if not larger than the Pleistocene glaciations, existed on a supercontinent in the Southern Hemisphere. This ice sheet, persisting for over 60 m.y., was one of the most prolonged periods of continuous glaciation in Earth history. Model simulations indicate that given the geography, solar luminosity (3% less than present), and atmospheric CO_2 (same as present) estimated for this time period, summer snow cover remains as far equatorward as 35°S latitude. Global mean temperature is -2.4°C, 17.2°C cooler than for present. Probable regions for the initiation of the Carboniferous ice sheet are apparent in analysis of the spin-up of the model to equilibrium. Summer snow cover first persists along the polar coastline of the supercontinent during year 4 of the simulation. Summer snow cover shows the greatest sensitivity to solar luminosity. Reducing land elevations to sea level causes persistent summer snow cover to retreat only 8° poleward. Conversely, initializing the model with an elevated land ice sheet has no effect on summer snow cover extent. (Auth. mod.)

51-452

Microphysical examination of excess cloud absorption in the tropical atmosphere.

Lubin, D., Chen, J.P., Pilewskie, P., Ramanathan, V., Valero, F.P.J., *Journal of geophysical research,* July 27, 1996, 101(D12), p.16,961-16,972, 26 refs.

Climatology, Cloud physics, Optical properties, Solar radiation, Radiation absorption, Radiance, Ice crystals, Ice crystal optics, Particle size distribution, Water content, Mathematical models, Simulation

51-453

Sensitivity of cirrus cloud albedo, bidirectional reflectance and optical thickness retrieval accuracy to ice particle shape.

Mishchenko, M.I., Rossow, W.B., Macke, A., Lacis, A.A., *Journal of geophysical research,* July 27, 1996, 101(D12), p.16,973-16,985, 47 refs.

Climatology, Cloud cover, Cloud physics, Cloud droplets, Optical properties, Albedo, Reflectivity, Light scattering, Spheres, Ice crystal optics, Fractals, Mathematical models

51-454

Correction to "Noctilucent clouds and the thermal structure near the arctic mesopause in summer" by F.J. Lübken, K.H. Fricke, and M. Langer.

Journal of geophysical research, July 27, 1996, 101(D12), p.17,045-17,046, 1 ref. For pertinent paper see 50-5453.

Climatology, Polar atmospheres, Cloud physics, Profiles, Spheres, Ice crystal optics, Air temperature, Thermal analysis, Backscattering

51-455

Microphysical and electrical evolution of a Florida thunderstorm. 1. Observations.

French, J.R., Helsdon, J.H., Detwiler, A.G., Smith, P.L., *Journal of geophysical research,* Aug. 27, 1996, 101(D14), p.18,961-18,977, 44 refs.

Precipitation (meteorology), Thunderstorms, Remote sensing, Radar echoes, Cloud physics, Electric fields, Cloud electrification, Snow pellets, Snow crystal growth, Detection, Water content, Polarization (charge separation), Ice dielectrics, United States—Florida

51-456

Sensitivity of a general circulation model to changes in northern hemisphere ice sheets.

Felzer, B., Oglesby, R.J., Webb, T., III, Hyman, D.E., *Journal of geophysical research,* Aug. 27, 1996, 101(D14), p.19,077-19,092, 21 refs.

Climatology, Climatic factors, Surface temperature, Temperature distribution, Atmospheric circulation, Albedo, Ice sheets, Altitude, Topographic effects, Glacier oscillation, Ice air interface, Ice cover effect, Mathematical models, Thermodynamics

51-457

Simulations of antarctic climate using a limited area model.

Walsh, K., McGregor, J.L., *Journal of geophysical research,* Aug. 27, 1996, 101(D14), p.19,093-19,108, 50 refs.

Climatology, Polar atmospheres, Air temperature, Surface temperature, Sea ice distribution, Snow accumulation, Air ice water interaction, Ice heat flux, Ice cover effect, Ice openings, Mathematical models, Simulation

A limited area model is nested within the European Centre for Medium-Range Weather Forecasts (ECMWF) analyses and climate simulations are performed for July at a resolution of 125 km for a domain located over the continent of Antarctica. The model displays negative biases of mean sea level pressure off the coast of East Antarctica, and positive biases in other oceanic regions close to the coast of the continent. The model simulation of snow accumulation is good; the observed positive gradient of accumulation between the center of Antarctica and the coast is reproduced well, although precipitation is generally too high over regions of significant orography. Comparison between simulations performed with and without oceanic leads shows that leads increase sensible and latent heat fluxes over regions of sea ice, and increase accumulation over the continent of Antarctica. The effects of the introduction of leads into the limited area model are consistent with the results of similar general circulation model sensitivity tests previously performed. (Auth. mod.)

51-458

Interannual variations in antarctic precipitation related to El Niño-Southern Oscillation.

Cullather, R.I., Bromwich, D.H., Van Woert, M.L., *Journal of geophysical research,* Aug. 27, 1996, 101(D14), p.19,109-19,118, 67 refs.

Climatology, Polar atmospheres, Synoptic meteorology, Precipitation (meteorology), Periodic variations, Atmospheric circulation, Moisture transfer, Sea level, Simulation, Climatic factors

The accurate estimation of antarctic precipitation variability is an essential component in understanding global sea level fluctuations; direct measurement techniques, however, are replete with practical difficulties. In this study, net precipitation (precipitation minus sublimation) for the antarctic continent is computed for 1980-1994 using operational numerical analyses obtained from the ECMWF (European Centre for Medium-Range Weather Forecasts). The resulting estimations reveal a strong interannual variability for the antarctic continent, implying a ±1.2-1.5 mm/yr maximum range in the antarctic eustatic change contribution. In particular, variability for the South Pacific sector is shown to be correlated with the El Niño-Southern Oscillation (ENSO) phenomenon for 1980-1990. The relation becomes anticorrelated after 1990, associated with a strong East Antarctic ridging pattern that coincides with the start of the prolonged series of warm events of the early 1990s. This result is relevant to other studies relating ENSO variability to high southern latitudes, and a more elaborate picture of this teleconnection pattern is presented. (Auth. mod.)

51-459

Surface energy and mass balance at Halley, Antarctica during winter.

King, J.C., Anderson, P.S., Smith, M.C., Mobbs, S.D., *Journal of geophysical research,* Aug. 27, 1996, 101(D14), p.19,119-19,128, 28 refs.

Climatology, Polar atmospheres, Blowing snow, Mass balance, Snowdrifts, Sublimation, Snow air interface, Heat flux, Surface energy, Radiant cooling, Radiation balance, Mathematical models, Antarctica—Halley Station

The authors present measurements of the components of the energy and mass balance of the snow surface at Halley Station. During the winter months, when insolation is small or zero, the surface energy balance is dominated by radiative cooling. This is mostly balanced by a downward transport of atmospheric sensible heat, with an upward conductive flux of heat through the snowpack making a secondary contribution. The average flux of atmospheric latent heat is downward but of negligible importance in the surface energy balance. During the winter, a significant imbalance is seen in the measured energy budget, with insufficient sensible and conductive heat fluxes to balance the radiative cooling. The wintertime surface mass balance is dominated by precipitation. Sublimation of blowing snow makes a small negative contribution to the budget and is observed to be highly dependent on wind speed. It is suggested that this may be an important mechanism for removing surface mass in some parts of Antarctica. (Auth. mod.)

51-460

Comparison of analyzed stratospheric temperatures and calculated trajectories with long-duration balloon data.

Knudsen, B.M., Rosen, J.M., Kjome, N.T., Whitten, A.T., *Journal of geophysical research,* Aug. 27, 1996, 101(D14), p.19,137-19,145, 10 refs.

Climatology, Polar atmospheres, Stratosphere, Air temperature, Aerial surveys, Balloons, Wind direction, Temperature measurement, Temperature variations, Radio echo soundings, Correlation, Statistical analysis

51-461

First simultaneous and common volume observations of noctilucent clouds and polar mesosphere summer echoes by lidar and radar.

Nussbaumer, V., Fricke, K.H., Langer, M., Singer, W., von Zahn, U., *Journal of geophysical research,* Aug. 27, 1996, 101(D14), p.19,161-19,167, 24 refs.

Climatology, Polar atmospheres, Stratification, Profiles, Cloud physics, Wind velocity, Radio waves, Atmospheric electricity, Optical phenomena, Lidar, Radar echoes, Correlation

51-462

New technique for investigating phase transition processes of optically levitated droplets consisting of water and sulfuric acid.

Anders, K., Roth, N., Frohn, A., *Journal of geophysical research,* Aug. 27, 1996, 101(D14), p.19,223-19,229, 15 refs.

Atmospheric composition, Condensation trails, Simulation, Cloud physics, Cloud droplets, Supercooled clouds, Phase transformations, Ice vapor interface, Freezing points, Lasers, Resonance, Cold chambers, Light scattering, Optical phenomena, Temperature effects

51-463

Changes in natural lead, copper, zinc and cadmium concentrations in central Greenland ice from 8250 to 149,100 years ago: their association with climatic change and resultant variations of dominant source contributions.

Hong, S.M., Candelone, J.P., Turetta, C., Boutron, C.F., *Earth and planetary science letters,* Sep. 1996, 143(1-4), p.233-244, 52 refs.

Paleoclimatology, Pleistocene, Climatic changes, Aerosols, Dust, Metals, Fallout, Atmospheric circulation, Ice sheets, Ice cores, Chemical analysis, Origin, Periodic variations, Greenland—Summit

51-464

Mechanism for maintaining the structure of the baroclinic fields of the Arctic Ocean by tidal motions.

Poliakov, I.V., *Russian Academy of Sciences. Transactions. Earth science sections,* Dec. 1995, 337(5), p.42-44, Translated from Rossiĭskaia akademiia nauk. Doklady. 4 refs.

Oceanography, Ocean currents, Tidal currents, Water structure, Subsidence, Salinity, Turbulent exchange, Turbulent boundary layer, Simulation, Arctic Ocean

51-465

Formation of the mineral assemblages in cryogenic and deep-seated supergenesis.

Chernikov, A.A., Dorfman, M.D., Dvurechenskaia, S.S., *Russian Academy of Sciences. Transactions. Earth science sections,* Dec. 1995, 337(5), p.91-95, 15 refs. For Russian original see 49-1381.

Frozen ground chemistry, Geocryology, Permafrost physics, Permafrost transformation, Permafrost mass transfer, Diagenesis, Clay minerals, Rock properties

51-466

Scattering of plane waves from a layered media with a rough interface.

Bjørnø, L., Sun, S.B., *Journal of computational acoustics,* Mar. 1996, 4(1), p.1-9, 8 refs.

Underwater acoustics, Oceanography, Sound waves, Wave propagation, Scattering, Floating ice, Ice sheets, Ice acoustics, Ice models, Stratification, Ice water interface, Surface roughness, Simulation, Elastic properties

51-467

Importance of microphysical processes in the dynamics of a CSI mesoscale frontal cloud band.

Marecal, V., Lemaitre, Y., *Royal Meteorological Society. Quarterly journal B,* Jan. 1995, 121(522), p.301-318, 34 refs.

Precipitation (meteorology), Cloud physics, Synoptic meteorology, Fronts (meteorology), Atmospheric circulation, Subsidence, Humidity, Snow air interface, Snow evaporation, Wind direction, Cooling rate, Simulation

51-468

Modeling evapotranspiration and surface energy budgets across a watershed.

Flerchinger, G.N., Hanson, C.L., Wight, J.R., *Water resources research,* Aug. 1996, 32(8), p.2539-2548, 44 refs.

Watersheds, Water balance, Heat flux, Surface energy, Forest canopy, Vegetation factors, Evapotranspiration, Hydrologic cycle, Snow cover effect, Snowmelt, Vegetation factors, Mathematical models, Simulation

51-469

Thawing of polymer-bearing ice in moving water.

Smorygin, G.I., Salomatin, E.N., *Journal of engineering physics and thermophysics,* June 1996, 68(6), p.725-732, Translated from Inzhenerno-fizicheskiĭ zhurnal. 11 refs.

Polymers, Solutions, Ice physics, Ice water interface, Ice melting, Turbulent flow, Hydrodynamics, Surface structure, Layers, Heat transfer coefficient, Simulation

51-470

Local, instantaneous heat transfer coefficients for jet impingement on a phase change surface.

Bhansali, A.P., Black, W.Z., *Journal of heat transfer,* May 1996, 118(2), p.334-342, 40 refs.

Hydraulic jets, Ice water interface, Phase transformations, Ultrasonic tests, Ice acoustics, Heat transfer coefficient, Ice melting, Ice cover thickness, Surface roughness, Simulation

51-471

Deformation and friction of frozen peat soil.

Mironov, V.A., *Journal of friction and wear,* 1995, 16(6), p.89-93, Translated from Trenie i iznos. 5 refs.

Frozen ground mechanics, Peat, Frozen ground strength, Loading, Penetration tests, Ice solid interface, Friction, Plastic deformation, Elastic properties, Phase transformations, Penetration tests, Analysis (mathematics)

51-472

Wood frame walls in cold climate—vapour barrier requirements.

Thue, J.V., Skogstad, H.B., Homb, A., *Journal of thermal insulation and building envelopes,* July 1996, Vol.20, p.63-75, 10 refs.

Buildings, Walls, Wooden structures, Thermal insulation, Composite materials, Cold weather performance, Cold weather tests, Permeability, Moisture transfer, Vapor diffusion, Design criteria, Ice formation

51-473

Simulation of flow in crystalline rock and recharge from overlying glacial deposits in a hypothetical New England setting.

Harte, P.T., Winter, T.C., *Ground water,* Nov.-Dec. 1995, 33(6), p.953-964, 42 refs.

Hydrogeochemistry, Ground water, Water table, Subsurface drainage, Water flow, Glacial deposits, Glacial geology, Bedrock, Hydraulics, Topographic effects, Mathematical models

51-474

Numerical simulation of the formation of brine pockets during the freezing of the NaCl-H_2O compound from above.

Medjani, K., *International communications in heat and mass transfer,* Nov. 1996, 23(7), p.917-928, 13 refs.

Solutions, Sea ice, Phase transformations, Sea water freezing, Mass transfer, Brines, Slush, Liquid phases, Thermal expansion, Ice water interface, Mathematical models, Simulation

51-475

Velocity dispersion and viscous relaxation in supercooled water.

Cunsolo, A., Nardone, M., *Journal of chemical physics,* Sep. 8, 1996, 105(10), p.3911-3917, 29 refs.

Supercooling, Liquid cooling, Water structure, Molecular energy levels, Hydrodynamics, Acoustics, Light scattering, Lasers, Wave propagation, Spectra, Viscoelasticity, Temperature effects

51-476

Calculation of the rotational Raman spectrum of H_2 in ice.

Mei, H.S., Xiao, L., Coker, D.F., *Journal of chemical physics,* Sep. 8, 1996, 105(10), p.3938-3941, 13 refs.

Ice physics, Ice spectroscopy, Ice structure, Spectra, Molecular energy levels, Molecular structure, Orientation, Hydrogen bonds, Simulation, Latticed structures

51-477

Grèzes, grèzes litées: a history of definitions. [Grèzes, grèzes litées: historique de définitions]

Ozouf, J.C., Coutard, J.P., Lautridou, J.P., *Permafrost and periglacial processes,* Apr.-June 1995, 6(2), Grèzes Litées Symposium, Riems, France, Sep. 4-9, 1994. Selected papers, p.85-87, In French with English summary. 11 refs.

Periglacial processes, Slope processes, Geocryology, Frost shattering, Sediments, Rock streams, Classifications

51-478

Some section characteristics of slope deposits of Aquitaine: facies and dynamic interpretation. [Quelques coupes caractéristiques dans les dépôts de versant d'Aquitaine septentrionale: faciès et interprétation dynamique]

Ozouf, J.C., Texier, J.P., Bertran, P., Coutard, J.P., *Permafrost and periglacial processes,* Apr.-June 1995, 6(2), Grèzes Litées Symposium, Riems, France, Sep. 4-9, 1994. Selected papers, p.89-101, In French with English summary. 26 refs.

Slope processes, Periglacial processes, Rock streams, Talus, Mass flow, Solifluction, Sediment transport, Stratification, Topographic features, Stratigraphy, France—Aquitaine

51-479

Genetic processes of the origin of gravel slope chalk formations in Champagne. [Processus génétiques à l'origine des formations de pente à graviers de craie en Champagne]

Laurain, M., Guérin, H., Marre, A., Richard, J., *Permafrost and periglacial processes,* Apr.-June 1995, 6(2), Grèzes Litées Symposium, Riems, France, Sep. 4-9, 1994. Selected papers, p.103-108, In French with English summary. 3 refs.

Slope processes, Gravel, Geologic processes, Soil formation, Eolian soils, Periglacial processes, Frost shattering, Sedimentation, Solifluction, Stratification, Cryoturbation, France—Champagne

51-480

Lessons of the morpho-sedimentary study of the stratified sediments of Tilly-sur-Meuse. [Enseignements de l'étude morphosédimentaire de la grézière de Tilly-sur-Meuse]

Harmand, D., Weisrock, A., Deshaies, M., *Permafrost and periglacial processes,* Apr.-June 1995, 6(2), Grèzes Litées Symposium, Riems, France, Sep. 4-9, 1994. Selected papers, p.109-117, In French with English summary. 15 refs.

Slope processes, Periglacial processes, Soil formation, Cryoturbation, Geomorphology, Sediment transport, Stratification, Stratigraphy, Lithology, Quaternary deposits, France—Tilly-sur-Meuse

51-481

Lorraine grèzes litées deposits.

Deshaies, M., Ghanini, S., Harmand, D., Weisrock, A., *Permafrost and periglacial processes,* Apr.-June 1995, 6(2), Grèzes Litées Symposium, Riems, France, Sep. 4-9, 1994. Selected papers, p.119-123, With French summary. 1 ref.

Slope processes, Periglacial processes, Sediment transport, Stratification, Lithology, Alluvium, Stratigraphy, Classifications, France—Lorraine

51-482

Models for the genetic and environmental interpretation of stratified slope deposits: a review.

Van Steijn, H., Bertran, P., Francou, B., Hétu, B., Texier, J.P., *Permafrost and periglacial processes,* Apr.-June 1995, 6(2), Grèzes Litées Symposium, Riems, France, Sep. 4-9, 1994. Selected papers, p.125-146, With French summary. 57 refs.

Slope processes, Soil formation, Talus, Lithology, Sediment transport, Periglacial processes, Geomorphology, Cryoturbation, Stratification, Eolian soils, Models, Classifications

51-483

Stratification of stratified talus deposits in Gaspésie, (Québec, Canada): the role of niveo-aeolian sedimentation and supranival transport. [Le litage de éboulis stratifés cryonivaux en Gaspésie (Québec, Canada): rôle de la sédimentation nivéo-éolienne et des transits supranivaux]

Hétu, B., *Permafrost and periglacial processes,* Apr.-June 1995, 6(2), Grèzes Litées Symposium, Riems, France, Sep. 4-9, 1994. Selected papers, p.147-171, In French with English summary. 24 refs.

Slope processes, Periglacial processes, Talus, Soil formation, Mass flow, Geomorphology, Eolian soils, Sediment transport, Mudflows, Sliding, Snowmelt, Stratification, Canada—Quebec—Gaspésie

51-484

Role of dry stone grain flow in the formation of a certain type of stratified scree. [Le rôle des coulées de pierres sèches dans la genèse d'un certain type d'éboulis stratifiés]

Hétu, B., Van Steijn, H., Bertran, P., *Permafrost and periglacial processes,* Apr.-June 1995, 6(2), Grèzes Litées Symposium, Riems, France, Sep. 4-9, 1994. Selected papers, p.173-194, In French with English summary. 46 refs.

Slope processes, Periglacial processes, Sediment transport, Soil formation, Mass flow, Stratification, Frost weathering, Stratigraphy, Lithology, Quaternary deposits, Simulation

51-485

Some considerations concerning the nature of slope processes in the Carpathian Mountains. [Quelques considérations concernant des formations de pente dans les Carpates Méridionales]

Urdea, P., *Permafrost and periglacial processes,* Apr.-June 1995, 6(2), Grèzes Litées Symposium, Riems, France, Sep. 4-9, 1994. Selected papers, p.195-206, In French with English summary. 25 refs.

Slope processes, Periglacial processes, Alpine landscapes, Geomorphology, Lithology, Grain size, Stratification, Soil formation, Sediment transport, Talus, Frost shattering, Solifluction, Quaternary deposits, Romania—Carpathian Mountains

51-486

Snow and avalanches in the Swiss Alps, winter 1994/95. [Schnee und Lawinen in den Schweizer Alpen, Winter 1994/95], *Davos, Switzerland. Eidgenössisches Institut für Schnee- und Lawinenforschung. Winterbericht,* 1996, No.59, 233p., In German. Refs. p.231-233.

Snow surveys, Snowfall, Snow depth, Snow accumulation, Snow cover stability, Weather stations, Meteorological data, Avalanches, Accidents, Switzerland

51-487

Interferometric synthetic aperture radar (IFSAR) for fast, accurate digital elevation mapping.

Chadwick, D.J., Bolus, R.L., McKim, H.L., MP 3911, Thematic Conference on Remote Sensing for Marine and Coastal Environments, 3rd, Seattle, WA, Sep. 18-20, 1995. Proceedings. Vol.2, Ann Arbor, Environmental Research Institute of Michigan (ERIM), [1995], p.783-790, 5 refs.

Topographic surveys, Topographic maps, Floodplains, Flood forecasting, Shore erosion, Aerial surveys, Spaceborne photography, Synthetic aperture radar, Radio echo soundings, Height finding, Image processing, Statistical analysis

Interferometric Synthetic Aperture Radar (IFSAR) systems can rapidly generate digital elevation data with a higher resolution and accuracy than presently existing digital data sets. Although improvements in vertical resolution are still required, this technology may be extremely beneficial for coastal studies, including monitoring coastal and barrier island erosion, and for flood and storm surge prediction. The U.S. Army Corps of Engineers' Remote Sensing/GIS Center participated in a test of the accuracy of the IFSAR system developed by the Environmental Research Institute of Michigan (ERIM) and the Jet Propulsion Laboratory (JPL). In this study, elevations for points derived by interferometry were compared with field-surveyed elevations. A root mean square error of 1.89 m and a maximum error of 2.92 m were found for the 11 points in this study, conducted in the flood plain of the Iowa River. These results are comparable with previous studies of IFSAR technology.

51-488

Droplet sizing instrumentation used in icing facilities.

Society of Automotive Engineers, Jones, K.F., MP 3912, *SAE aerospace information report,* 1994, AIR 4906, 45p., 47 refs. K.F. Jones was one of the contributors to this report.

Aircraft icing, Ice accretion, Ice forecasting, Ice detection, Supercooled clouds, Cloud droplets, Particle size distribution, Lasers, Wind tunnels

51-489

Bibliography of glacier studies by the U.S. Geological Survey.

Snyder, E.F., *U.S. Geological Survey. Open-file report,* 1996, No.95-723, 35p., *Ca.* 470 citations.

Glacier surveys, Glacier oscillation, Glacier mass balance, Glacial hydrology, Bibliographies

51-490

New flexible pavement design method. Formulation of a user-friendly mechanistic/empirical design system for Swedish conditions. [Dimensionering vid nybyggnad. Utformning av ett användarvänligt mekanistiskt/empiriskt dimensioneringssystem för förhållanden]

Djärf, L., Wiman, L.G., Carlsson, H., *Sweden. Statens väg- och transportforskningsinstitut. VTI meddelande,* 1996, No.778, 53p. + appends., In Swedish with English summary. 16 refs.

Pavements, Road maintenance, Highway planning, Cold weather performance, Bearing strength, Trafficability, Frost heave, Frost protection, Computer programs, Sweden

51-491

Evaluation of a CMA/NaCl-mixture. Effect on road condition/friction, ice melting capacity, corrosion and impact on concrete. [Utvärdering av CMA/NaCl-blandning. Effekt på väglag/friktion, smältförmåga, korrosion och betongpåverkan]

Ihs, A., Gustafson, K., Persson, K., *Sweden. Statens väg- och transportforskningsinstitut. VTI meddelande,* 1996, No.788, 99p. + append., In Swedish with English summary. 10 refs.

Road icing, Chemical ice prevention, Salting, Skid resistance, Concrete pavements, Corrosion, Road maintenance, Sweden

51-492

Calcium magnesium acetate (CMA)—an alternative deicing agent. A literature review. [Kalcium-magnesiumacetat (CMA)—ett halkbekämpningsmedel. Litteraturstudie]

Ihs, A., Gustafson, K., *Sweden. Statens väg- och transportforskningsinstitut. VTI meddelande,* 1996, No.789, 32p., In Swedish with English summary. 44 refs.

Road icing, Chemical ice prevention, Salting, Environmental impact, Concrete pavements, Corrosion, Road maintenance, Cost analysis, Sweden

51-493

Building in the North.

Rice, E.F., Bennett, F.L., Anchorage, AK, Alaska Science & Technology Foundation, 1996, 93p., Refs. passim. 4th edition revised under F.L. Bennett. For 1st edition see 32-2499.

Cold weather construction, Permafrost beneath structures, Permafrost control, Houses, Weatherproofing, Thermal insulation, Heating, Vapor barriers, Water supply, Sewage disposal, Sanitary engineering

51-494

Annual report 1995.

Fridtjof Nansen Institute (Fridtjof Nansens Institutt), Lysaker, Norway, May 1996, 6p., In English with part of the text in parallel Norwegian.

Organizations, Research projects, Regional planning, International cooperation, Cost analysis

51-495

Laser-based aircraft ice detector enters service.

DeMeis, R., *Laser focus world,* Mar. 1996, 32(3), p.37.

Aircraft icing, Ice detection, Lasers

51-496

Thoughts on a structure for assembling balloon experiments at Williams Field, Antarctica.

Tobiasson, W., MP 3913, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, Apr. 1989, 19p.

Balloons, Meteorological instruments, Telemetering equipment, Towers, Wooden structures, Cold weather construction, Snow loads, Wind pressure, Cost analysis, Antarctica—McMurdo Station

In 1989, a 20-ft high wooden panel structure with a 16-ft by 20-ft floor supported by steel beams, was proposed to fit out a 12-ft high gondola for balloon experiments at Williams Field, McMurdo Station. The gondola would be suspended from a laminated veneer wooden roof beam. The structure would be capable of withstanding high winds and heavy snowdrifts. Ski assemblies could be attached at the four corners so that the entire structure could be towed by a tracked vehicle to a new location. The total cost estimate in 1989 was $21,500.

51-497

Preliminary report on the condition of the South Pole Station.

Tobiasson, W., MP 3914, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, [1989], 10p., Prepared for Division of Polar Programs, National Science Foundation.

Stations, Buildings, Snowdrifts, Snow loads, Settlement (structural), Cold weather construction, Antarctica—Amundsen-Scott Station

In 1989, the Amundsen-Scott Station at the South Pole was scheduled to be replaced by a new station by the end of 1996. The main facilities of the existing station are housed in a 164-ft-diameter, 53-ft-high aluminum geodesic dome and a 726-ft-long, 46-ft-diameter metal arch. It is recommended that the new station consist of a cluster of extensible or movable steel-frame, sandwich-panel buildings, 2 stories high with a floor plan of 38 ft by 64 ft, elevated on columns about 8 ft above the surface, and less susceptible to snow loads and differential settlement from snow loads than the existing dome and arch. The dome could be used as a warehouse and portions of the arch could be used for fuel storage for the new station.

51-498

Rowe Glacier annual research report 1994.

Scott, R.B., Denver, CO, U.S. National Park Service, Rocky Mountain Regional Office, Mar. 1995, 4p. + photos, WDCA 95000188.

Mountain glaciers, Cirque glaciers, Glacier surveys, Glacier oscillation, United States—Colorado—Rocky Mountain National Park

51-499

Mapping montane snow cover at subpixel resolution from the Landsat Thematic Mapper.

Rosenthal, C.W., MP 3915, Santa Barbara, University of California, 1993, 70p., WDCA 95000169, M.A. thesis. 70 refs. Partially funded by the U.S. Army Cold Regions Research and Engineering Laboratory under Contract No.DACA89-92-K-0008.

Snow surveys, Snow cover distribution, Snow hydrology, Snow water equivalent, Snowmelt, Runoff forecasting, Terrain identification, Spaceborne photography, Image processing, Statistical analysis, United States—California—Sierra Nevada

A fully automated method uses Landsat Thematic Mapper data to map snow cover in the Sierra Nevada and make quantitative estimates of the fractional snow covered area within each pixel. A 1986 reference scene was modeled as a linear mixture of image endmember spectra to produce the response variables for tree-based regression and classification models. Decision trees identify cloud cover, snow extent, and fractional snow covered area. The algorithm is tested on a new Thematic Mapper scene against high resolution, large format, color aerial photography. The accuracy of the automated classification of Thematic Mapper data equals that obtainable from the photographs, but is faster, cheaper, and covers a vastly larger area. Mapping of snow supports the linear spectral mixing assumption. The mapping method is insensitive to the choice of lithologic or vegetation endmembers and to the water equivalent of the snow pack.

51-500

Maximum-accumulation snowpack chemistry at selected sites in northwestern Colorado during spring 1994.

Ingersoll, G.P., *U.S. Geological Survey. Open-file report,* 1995, No.95-139, 14p., WDCA 95000179, 3 refs.

Snow accumulation, Snow composition, Snow hydrology, Snowmelt, Water chemistry, United States—Colorado

51-501

Climatology and regionalization of heavy areal precipitation in the Swiss northern Alps. [Klimatologie und Regionalisierung starker Gebietsniederschläge in der nordalpinen Schweiz]

Grebner, D., *Zürcher Geographische Schriften,* 1995, No.59, 149p., WDCA 95000442, In German with English summary. Refs. p.134-140.

Precipitation (meteorology), Thunderstorms, Weather forecasting, Statistical analysis, Switzerland

51-502

Calculation of flow avalanches. A guide for the practitioner with examples. [Berechnung von Fliesslawinen. Eine Anleitung für Praktiker mit Beispielen]

Salm, B., Burkard, A., Bubler, H.U., *Eidgenössisches Institut für Schnee- und Lawinenforschung. Mitteilungen,* July 1990, No.47, 37p., WDCA 95000311, In German.

Snow cover stability, Avalanche forecasting, Avalanche modeling, Avalanche mechanics, Avalanche tracks, Mathematical models

51-503

Glacier studies on Nanga Parbat 1856-1990. [Gletscherforschung am Nanga Parbat 1856-1990]

Kick, W., *Deutscher Alpenverein, Munich. Wissenschaftliche Alpenvereinshefte,* 1994, No.30, 153p., WDCA 95000150, In German with English summary. Refs. p.145-153.

Mountain glaciers, Alpine glaciation, Glacier surveys, Glacier oscillation, Glacier thickness, Photogrammetric surveys, Paleoclimatology, Pakistan—Nanga Parbat Mountain

51-504

Population biology of steppe plants.

Vorontsova, L.I., Zaugol'nova, L.B., Handbook of vegetation science, Part 3. Population structure of vegetation. Edited by J. White, Dordrecht, Netherlands, Dr W. Junk Publishers, 1985, p.143-178, Refs. p.176-178.

DLC QK911.H3 Pt.3

Steppes, Plant ecology, Plant physiology, Vegetation patterns, Grasses, Phenology, Kazakhstan

51-505

Population structure and processes of tundra plants and vegetation.

Callaghan, T.V., Emanuelsson, U., Handbook of vegetation science, Part 3. Population structure of vegetation. Edited by J. White, Dordrecht, Netherlands, Dr W. Junk Publishers, 1985, p.399-439, Refs. p.434-439.

DLC QK911.H3 Pt.3

Tundra vegetation, Plant ecology, Plant physiology, Vegetation patterns, Acclimatization

51-506

Effects of enhanced UV-B radiation and elevated concentrations of CO_2 on a subarctic heathland.

Gwynn-Jones, D., et al, Carbon dioxide, populations, and communities. Edited by C. Körner and F.A. Bazzaz, San Diego, CA, Academic Press, 1996, p.197-207, 41 refs.

DLC QK753.C3C38 1996

Plant ecology, Plant physiology, Forest tundra, Tundra vegetation, Peat, Nutrient cycle, Atmospheric composition, Ozone, Solar radiation, Ultraviolet radiation, Physiological effects, Sweden

51-507

Satellite monitoring of lake ice breakup on the Laurentian shield as a robust climate indicator.

Wynne, R.H., Madison, University of Wisconsin, 1995, 211p., University Microfilms order No.DA9608372, Ph.D. thesis. Refs. p.162-172.

Frozen lakes, Lake ice, Ice melting, Ice breakup, Ice surveys, Ice detection, Ice forecasting, Spaceborne photography, Global warming, Computer programs, Statistical analysis

51-508

Non-linear finite element modelling of dynamic loads on offshore structures.

Morsy, U.A.E., Calgary, Alberta, University of Calgary, 1995, 262p., Ph.D. thesis. Refs. p.243-252.

Offshore structures, Artificial islands, Caissons, Ice solid interface, Ice loads, Ice pressure, Ice friction, Ice cover strength, Ice deformation, Ice breaking, Mathematical models

51-509

Direct effects of elevated CO_2 on arctic plant and ecosystem function.

Oechel, W.C., Vourlitis, G.L., Carbon dioxide and terrestrial ecosystems. Edited by G.W. Koch and H.A. Mooney, San Diego, CA, Academic Press, 1996, p.163-176, 46 refs.

DLC QK753.C3C37 1996

Plant ecology, Plant physiology, Tundra vegetation, Tundra soils, Tundra climate, Nutrient cycle, Polar atmospheres, Atmospheric composition, Soil air interface, Global warming

51-510

Response of alpine vegetation to elevated CO_2.

Körner, C., Diemer, M., Schäppi, B., Zimmermann, L., Carbon dioxide and terrestrial ecosystems. Edited by G.W. Koch and H.A. Mooney, San Diego, CA, Academic Press, 1996, p.177-196, 31 refs.

DLC QK753.C3C37 1996

Plant ecology, Plant physiology, Alpine tundra, Tundra vegetation, Nutrient cycle, Mountain soils, Soil air interface, Atmospheric composition

51-511

Development and results of a Northern Sea Route transit model.

Mulherin, N.D., Eppler, D.T., Proshutinskiĭ, T.O., Proshutinskiĭ, A.IU., Farmer, L.D., Smith, O.P., CR 96-05, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* May 1996, 105p., ADA-311 979, 43 refs.

Mathematical models, Ice navigation, Marine transportation, Cost analysis, Sea ice, Economic analysis, Computer applications, Simulation, Icebreakers, Ships, Tanker ships, Northern Sea Route

For a Corps of Engineers reconnaissance study, the authors developed a numerical model to estimate the time needed for various ship types to transit the Russian Northern Sea Route. They simulated liquid bulk, dry bulk, and container ship transits during the months of Apr., June, Aug. and Oct. In the model, probability distributions for various ice, ocean and atmospheric inputs are exercised by a Monte Carlo algorithm to generate combinations of conditions that affect ship speed. The speed, dependent on the established environment during each time and distance segment, is read from empirically derived lookup tables. Daily ship rates and Russian passage fees were applied to calculate the relative total costs for moving the various cargoes over the route. The model's development, limiting assumptions, simulation logic, data inputs, and resulting output are discussed.

51-512

Geological and geophysical investigations of the hydrogeology of Fort Wainwright, Alaska; Part I: Canol Road area.

Lawson, D.E., Strasser, J.C., Strasser, J.D., Arcone, S.A., Delaney, A.J., Williams, C., CR 96-04, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* May 1996, 24p., ADA-313 645, 11 refs.

Alluvium, Hydrogeology, Ground water, Permafrost distribution, Boreholes, Radar, Bedrock, Suprapermafrost ground water, Subpermafrost ground water, Wells, Seepage, United States—Alaska—Fort Wainwright, United States—Alaska—Chena River

The hydrogeology of Fort Wainwright, AK, is extremely complex because of the relatively impermeable discontinuity of permafrost, which controls the distribution and dimensions of the aquifer. Aquifers occur above, below and adjacent to permanently frozen materials, as well as within thaw zones surrounded by permafrost. This complexity makes it difficult to predict the direction and rate of ground water flow, as well as its seasonal and annual variability. Considerable problems exist in locating suspected contaminant plumes, identifying source areas, defining transport paths and evaluating contaminant fate. This report summarizes the results of ongoing investigations of the permafrost and ground water conditions within the northwestern part of the Fort Wainwright cantonment area, north of the Chena River. Data from ground-penetrating radar, drilling, ground water flow sensors, aerial photographs and ground observations were used to delineate aquifer distribution and develop a conceptual physical model of hydrogeological conditions. Ground water seepage velocity and direction, which were measured during early to mid-winter 1994-95, reflect the role of local water sources and permafrost distribution in determining ground water flow patterns. Other factors, including the vertical and lateral extent of permafrost, a bedrock aquifer, and the alluvial origins of unfrozen sediments and landforms, are apparently more important than the subregional aquifer in determining ground water conditions during winter. Contaminant migration will be strongly affected by these factors as well.

51-513

Sea ice: Part I. Bulk salinity versus ice floe thickness.

Kovacs, A., CR 96-07, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* June 1996, 16p., ADA-312 027, Refs. p.13-16.

Sea ice, Ice composition, Salinity, Ice floes, Ice cover thickness, Analysis (mathematics), Ice cores, Brines, Antarctica, Beaufort Sea

Mathematical expressions have been established for estimating the bulk salinity of Arctic and antarctic sea ice vs. ice floe thickness. The ice salinity vs. thickness relationships are based on data for over 400 sea ice cores compiled from numerous sources. The results show that the bulk salinity of first-year sea ice decreases in an exponential trend with ice sheet thickness. A similar trend reoccurs as the winter ice passes through the melt season. The expression for the bulk salinity S_B in per mill for first-year sea ice from 10 to 200 cm thick is S_B=4.606 + 91.603/T_F, where T_F is the ice floe thickness in centimeters.

51-514

Optical properties of sea ice.

Perovich, D.K., M 96-01, *U.S. Army Cold Regions Research and Engineering Laboratory. Monograph,* May 1996, 25p., ADA-310 586, Refs. p.21-23.

Sea ice, Ice optics, Albedo, Scattering, Air ice water interaction, Brines, Absorption, Ice models, Light transmission, Snow cover effect, Solar radiation, Antarctica—Weddell Sea

Sea ice is a translucent material with an intricate structure and complex optical properties. Understanding the reflection, absorption, and transmission of shortwave radiation by sea ice is important to a diverse array of scientific problems, including those in ice thermodynamics and polar climatology. Radiative transfer in sea ice is a combination of absorption and scattering. Differences in the magnitude of sea ice optical properties are due primarily to differences in scattering. Spectral variations are mainly a result of absorption. Changes in such optical properties as the albedo, reflectance, transmittance, and extinction coefficient are directly related to changes in the state and structure of the ice. Physical changes that enhance scattering, such as the formation of air bubbles due to brine drainage, result in larger albedos and extinction coefficients. The albedo is quite sensitive to the surface state. If the ice has a snow cover, albedos are large. In contrast, the presence of liquid water on a bare ice surface causes a decrease of albedo, which is more pronounced at longer wavelengths. Sea-ice optical properties depend on the volume of brine and air and on how the brine and air are distributed.

51-515

Ice thickness observations: North American arctic and subarctic, 1974-75, 1975-76 and 1976-77.
Bilello, M.A., Lunardini, V.J., SR 43/9, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* May 1996, 221p., ADA-310 887, 7 refs. For earlier data (from 1958 through 1974) see 24-3436, 26-2299, 27-674, 30-126 and 46-4002.
Sea ice, Lake ice, River ice, Ice cover thickness, Ice conditions, Ice breakup, Ice formation, Freezeup, Ice reporting, Snow depth, Subarctic landscapes, Canada, United States—Alaska
This is the ninth in a series of reports on lake and river ice and landfast sea ice. It presents ice thickness measurements taken throughout the North American arctic and subarctic during the 1974-75, 1975-76 and 1976-77 winter seasons. Information on surface ice conditions, dates of first ice, freeze-over, breakup and observed maximum ice thicknesses are also included.

51-516

Model reconstruction of the composition and temperature of the global troposphere and stratosphere in the last glacial and interglacial periods.
Karol', I.L., Kiselev, A.A., Frol'kis, V.A., *Russian Academy of Sciences. Transactions. Earth science sections,* 1994 (Pub. 1995), 339(8), p.21-26, Translated from Rossiĭskaia Akademia Nauk. Doklady. 12 refs.
Paleoclimatology, Glacial meteorology, Atmospheric composition, Air temperature, Ozone, Ice cores
A quantitative reconstruction is presented of the composition of minor gases (most importantly ozone) in the troposphere and stratosphere in certain periods of the history of the atmosphere, using the one-dimensional radiative and photochemical model (RPM), with refinements in the radiative part of the model. The use of a one-dimensional, horizontally averaged RMP is justified not only by the approximate lateral uniformity of present [CO_2], [CH_4], and [N_2O] distribution in the lower troposphere, but also by the fact that the measured concentrations of these gases in the old ice of cores from the widely separated Antarctic and Greenland ice caps are roughly equal. In the photochemical part of this model, the water vapor concentration [H_2O] in the troposphere is determined by the specified relative humidity and is calculated for the stratosphere. The model envisages 141 reactions of 42 compounds, of which 20 are in photochemical equilibrium, and corrections are introduced to produce averaging of their daily concentration variations. (Auth. mod.)

51-517

Report of the British Antarctic Survey 1994-95.
British Antarctic Survey, Cambridge, Natural Environment Research Council, [1995], 158p., Pubs. p.134-147.
Research projects, Glaciology
General remarks are made concerning staff news and activities in various divisions at BAS stations; personnel awards are announced; distinguished visitors, and British and international meetings attended, are listed. Logistic and operational activities are reviewed, including ship and air operations. A science strategy plan is presented; 5 principal and 2 minor science themes provide a framework for research programs which are reviewed in detail and consist of the following: Pattern and change in the physical environment of Antarctica; Geological evolution of West Antarctica; Dynamics of antarctic terrestrial and freshwater ecosystems; Structure and dynamics of the southern ocean ecosystem; Physics of solar-terrestrial phenomena from Antarctica; Humans in isolated polar communities; and Antarctic geographic information and mapping. Included are 5 appendices providing BAS' financial background, and lists of 1994 publications and staff in various locations, divisions and ships.

51-518

Impact of Late Ordovician glaciation-deglaciation on marine life.
Berry, W.B.N., Quinby-Hunt, M.S., Wilde, P., Studies in Geophysics: Effects of past global change on life. (Board on Earth Sciences and Resources, Commission on Geosciences, Environment, and Resources, National Research Council), Washington, D.C., National Academy Press, 1995, p.34-46, Refs. p.44-46.
DLC QE720.E32 1995
Paleoclimatology, Paleoecology, Glaciation, Ocean environments, Marine biology, Animals, Biomass, Sea ice distribution, Sea level
Sea level fell at least 50 m during Late Ordovician continental glaciation which centered on the South Pole. Oxygen isotope analyses indicate that ocean surface waters cooled during glaciation. As sea level fell and surface waters cooled, mass mortalities occurred among most marine benthic faunas, primarily brachiopods and trilobites. Carbon isotope analyses reveal a significant biomass loss at the time of the mass mortalities. The brachiopod-dominated *Hirnantia* fauna spread widely during glacial maximum. That fauna essentially became extinct during deglaciation. Cold, oxygen-rich deep ocean waters generated at the South Pole during glaciation drove a strong deep ocean circulation and ventilated the deep oceans. Potentially, waters bearing metal ions and other substances toxic to organisms were advected upward into ocean mixed layer during glacial maximum. Graptolite mass mortality apparently was a consequence. Mass mortalities took place among pre-*Hirnantia* brachiopod and trilobite faunas at the same time as the graptolite mass mortality. Reradiation among graptolites and benthic marine faunas followed after sea-level rise, and deep ocean circulation slowed as deglaciation proceeded. (Auth. mod.)

51-519

Relations between winter atmospheric circulation and annual streamflow in the western United States.
McCabe, G.J., Jr., *Climate research,* June 22, 1995, 5(2), p.139-148, 43 refs.
Climatology, Synoptic meteorology, Atmospheric circulation, Stream flow, Flow measurement, Hydrologic cycle, Moisture transfer, Statistical analysis, Correlation, Seasonal variations, United States

51-520

Calculation of the acoustic field in an arctic wavelength.
Kudriashov, V.M., *Acoustical physics,* 1996, 42(3), p.386-389, Translated from Akusticheskiĭ zhurnal. 6 refs.
Oceanography, Ice acoustics, Underwater acoustics, Sea ice, Ice water interface, Ice bottom surface, Surface roughness, Sound transmission, Scattering, Wave propagation, Attenuation, Mathematical models, Statistical analysis

51-521

Heterogeneous kinetics of HONO on H_2SO_4 solutions on ice: activation of HCl.
Fenter, F.F., Rossi, M.J., *Journal of physical chemistry,* 1996, Vol.100, p.13765-13775, 30 refs.
Climatology, Atmospheric composition, Aerosols, Weather modification, Condensation trails, Heterogeneous nucleation, Ice water interface, Spectroscopy, Simulation, Chemical properties

51-522

Changes in morphology at the margin of the Greenland ice sheet (Leverett Glacier), in the period 1943-1992: a quantitative analysis.
Van Tatenhove, F.G.M., *Earth surface processes and landforms,* 1996, Vol.21, p.797-816, 23 refs.
Glaciology, Ice sheets, Glacier oscillation, Glacial geology, Geomorphology, Ice edge, Glacier surveys, Photogrammetric surveys, Moraines, Topographic features, Height finding, Statistical analysis, Periodic variations, Correlation, Greenland—Leverett Glacier

51-523

Ice rhythms: core reveals a plethora of climate cycles.
Kerr, R.A., *Science,* Oct. 25, 1996, 274(5287), p.499-500.
Climatic changes, Periodic variations, Ice cores, Greenland

51-524

Concentration dependence of crystalline poly(ethylene terephthalate) prepared by freeze-extracting solutions.
Ji, G.D., Ni, H.M., Wang, C., Xue, G., Liao, Y.T., *Macromolecules,* Mar. 25, 1996, 29(7), p.2691-2693, 14 refs.
Frozen liquids, Recrystallization, Heating, Molecular structure

51-525

Textures and fabrics in the GRIP ice core, in relation to climate history and ice deformation.
Thorsteinsson, T., *Berichte zur Polarforschung,* 1996, No.205, 146p., With German summary. Refs. p.137-146.
Climatic changes, Ice deformation, Ice crystals, Ice cores, Greenland

51-526

Ocean as a part of the coupled climate system: an attempt to reconstruct the glacial circulation with different models of the atmosphere. [Der Ozean als Teil des gekoppelten Klimasystems: Versuch der Rekonstruktion der glazialen Zirkulation mit verschieden komplexen Atmosphärenkomponenten]
Fieg, K., *Berichte zur Polarforschung,* 1996, No.206, 128p., In German with English summary. 103 refs.
Ocean currents, Sea ice, Water chemistry, Climatic changes, Models
The goal of this thesis is to investigate the sensitivity of the Atlantic circulation to the surface forcing fields, e.g., wind stress, sea surface salinity (SSS) and sea surface temperatures (SST). Both the recent and the glacial Atlantic circulation are simulated and compared with ideas developed from drilling cores (glacial) and observations (modern). A model was developed for these elements and combined with models of other parameters. A set of experiments was devised to account for energy balance, sea ice distribution and drift, and varying degrees of sea surface salinity in antarctic waters. As various components of the models were shifted about through the experiments, in which some were omitted and others added, it became clear that a given set of paramaters could be successful for recent or glacial data, but not for both. (Auth. mod.)

51-527

Parameterization of the stable atmospheric boundary layer over an antarctic ice shelf. [Zur Parametrisierung der stabilen atmosphärischen Grenzschicht über einem antarktischen Schelfeis]
Handorf, D., *Berichte zur Polarforschung,* 1996, No.204, 133p., In German with English summary. 99 refs.
Atmospheric boundary layer, Air temperature, Wind (meteorology), Models, Ice shelves, Antarctica—Georg von Neumayer Station
The stable atmospheric boundary layer has been investigated on the basis of two extended boundary-layer experiments performed at the German antarctic research station Neumayer. Almost all parameterizations of the turbulent exchange in atmospheric models (from boundary-layer models up to global circulation models) are based on hydrodynamic theories and empirical laws (universal functions), which are valid above horizontal homogeneous surfaces. The conditions at the Neumayer Station allow the test of such theories as well as their further development. In this thesis empirical and theoretical investigations of parameterizations of the surface fluxes, the turbulent fluxes in the whole boundary layer and of the height of the stable boundary layer are performed. (Auth. mod.)

51-528

Dynamics, roughness, and age of Arctic sea ice: numerical investigations with a large-scale model. [Dynamik, Rauhigkeit und Alter des Meereises in der Arktis - Numerische Untersuchungen mit einem großskaligen Modell]
Harder, M., *Berichte zur Polarforschung,* 1996, No.203, 126p., In German with English summary. Refs. p.121-126.
Sea ice, Mathematical models, Dynamic properties, Ice structure, Age determination, Arctic Ocean

51-529

Atmospheric thermal radiation over the South Pole.
Van Allen-Heuberger, R., *Zürcher Geographische Schriften,* 1995, No.61, 109p., With German summary. Refs. p.86-88.
Atmospheric composition, Air temperature, Infrared radiation, Stratosphere, Ice crystals, Blowing snow, Clouds (meteorology), Meteorological instruments, Polar stratospheric clouds, Antarctica—Amundsen-Scott Station
Year-round measurements of mid-infrared atmospheric emission were conducted at the Amundsen-Scott Station during 1990, 1992 and 1993. The spectra were analyzed for information about stratospheric chemistry, precipitable water content and thermal emission of clouds, blowing snow and ice crystals. The data presented in this thesis are from 1992. The low water vapor content of the atmosphere at the South Pole allows the observation of stratospheric gases and the change in their concentration during the long absence of sunlight of the austral winter. The precipitable water vapor for clear-sky cases was calculated and a good correlation with the surface temperature was found. The values range from 0.2-0.8 mm and agree with the yearly average of the radiosonde data. A large seasonal change of the total column of nitric acid (HNO_3) vapor was observed. During the austral summer, the HNO_3 column abundance was about $2x10^{16}$ molecules/cm^2. There was a small increase in the fall. A rapid decrease of 50% was observed in late June. By early July, the stratospheric temperature was cold enough to form type II PSCs, and the HNO_3 column decreased to $7x10^{15}$ molecules/cm^2. Measured nitric acid values in the spring remained extremely low even after the

stratosphere warmed well above PSC temperatures. This may indicate permanent removal of HNO_3 by gravitational settling, or long-term sequestering in large particles. (Auth. mod.)

51-530

Global progress on problems of ozone depletion.

Hurtak, J.J., Intersociety Energy Conversion Engineering Conference, 28th, Atlanta, GA, Aug. 8-13, 1993. IECEC 1993. Proceedings. Vol.2, Washington, D.C., American Chemical Society, 1993, p.2.19-2.25, Refs. p.2.24-2.25.

DLC TK2896.I55a 1993

Ozone, Atmospheric composition, Ultraviolet radiation, Aerosols, Impurities, Clouds (meteorology), Stratosphere, Environmental protection, Polar stratospheric clouds

Global studies have been continually underway using airborne and satellite imaging of the ozone depletion. These measurements along with the Dobson network and balloon sonde experiments continue to monitor the extent of ozone depletion over the Antarctic and the Arctic and other chemical changes in the stratosphere. CFCs are not the only contributing factor to ozone depletion, but play a major role along with volcano aerosol emissions and other meteorological factors. Colder climates in Antarctica lead to the formation of PSCs that do not appear in the Northern Hemisphere. PSCs are a central platform for the formation of atomic chlorine and chemistry which leads to ozone destruction.

51-531

History of weather and climate in the Czech lands. 1: Period 1000-1500.

Brázdil, R., Kotyza, O., *Zürcher geographische Schriften,* 1995, No.62, 260p., Refs. p.181-223.

Climatology, Records (extremes), Weather, Climatic changes, Air temperature, Precipitation (meteorology), Hail, Snowfall, Czech Republic

51-532

Frequency distribution of sea ice, ridges, and water openings in the Greenland and Barents Seas. A preliminary report on the 'Birds Eye' observations.

Vinje, T.E., *Norsk Polarinstitutt. Rapportserie,* 1984, No.15, 27p., 13 refs.

Sea ice distribution, Pressure ridges, Ice conditions, Ice edge, Ice cover, Barents Sea, Greenland Sea

51-533

Atmospheric boundary layer over polar marine surfaces.

Andreas, E.L., M 96-02, *U.S. Army Cold Regions Research and Engineering Laboratory. Monograph,* June 1996, 38p., ADA-313 642, Refs. p.34-38.

Air ice water interaction, Atmospheric boundary layer, Mathematical models, Turbulence, Snow cover effect, Sea ice, Polar atmospheres, Surface roughness, Heat transfer coefficient, Antarctica—Weddell Sea

The Atmospheric Boundary Layer (ABL) over polar marine surfaces is, in ways, simpler and, in other ways, more complex than ABLs in other environments. It is simpler because topographic effects are rarely a concern, the surface is fairly homogeneous, and roughness lengths over sea ice and the ocean are much smaller than they are over land. It is complex because the stratification is usually stable, and stable ABLs have not yielded to quantification as readily as convective ABLs have. This report reviews some of these characteristics of ABLs over polar marine surfaces, including the Weddell Sea. The ABL, by definition, is the turbulent layer between the Earth's surface and the (generally) nonturbulent free atmosphere. Hence, the emphasis is on turbulence processes—in particular, the turbulent transfer of momentum and sensible and latent heat over sea ice. As such, this report reviews both the theoretical and observational bases for the understanding of the mean structure of the ABL. Understanding this structure then allows predicting the turbulent surface fluxes of momentum and sensible and latent heat. (Auth.)

51-534

On-site analysis for high concentrations of explosives in soil: extraction kinetics and dilution procedures.

Jenkins, T.F., Schumacher, P.W., Mason, J.G., Thorne, P.G., SR 96-10, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* May 1996, 12p., ADA-313 704, 19 refs.

Explosives, Soil pollution, Soil analysis, Military operation

Soils containing high concentrations (>10%) of secondary explosives might detonate from shock or flame, resulting in human injuries or equipment damage during remediation activities. In lieu of expensive and time-consuming protocols involving impact tests, friction tests, and shock gap tests, compositional analysis has been recommended as an expedient method to assess the risk of detonation from heavily contaminated soils. A number of methods now available allow determination of TNT and RDX on site. All of these methods specify solvent extraction with either acetone or methanol to transfer the analyte from the soil matrix to a solvent as the first step in the determination. The rate of extraction of TNT and RDX, when present at percent levels in soil, has not been determined. Protocols currently in use specify very short extraction times (one to three minutes) and results could be biased low if extraction kinetics are slow. The objective of this work was to document the rate of extraction of secondary explosives by acetone and methanol and make recommendations for possible modification of current protocols if warranted. Because solvent extracts from highly contaminated soils will have very high concentrations of secondary explosives, compared with the range of concentrations that can be determined using the various on-site methods, large dilutions will be required. Recommendations are made for a field-expedient method making appropriate dilutions.

51-535

Evaluating the SESOIL model for benzene leaching assessment in Alaska.

Brar, G.S., SR 96-11, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* May 1996, 11p., ADA-311 199, 34 refs.

Models, Simulation, Soil mechanics, Accuracy, Adsorption, Permeability, Porosity, Soil pollution, Ground water, Soil water, Degradation, United States—Alaska

SESOIL is a seasonal soil compartment model. A one-dimensional vertical transport model is designed to predict seasonal solute distribution in the soil profile and watershed. CRREL received a request from the U.S. Army Engineer District, Alaska, Environmental Technical Engineering Office, to provide technical assistance in evaluating the SESOIL model for helping to assess benzene leaching in the Alaskan environment. The major tasks outlined in the request were as follows: work an example problem for a diesel-contaminated site, do analytical checks and do manual SESOIL analytical calculations for one cycle. The SESOIL model requires 57 input variables supplied by the user. An additional 8 parameters are required for the execution file. This study did sensitivity analyses on soil bulk density, intrinsic permeability, disconnectedness index, porosity, organic carbon, adsorption coefficient on organic carbon, and biodegradation rates of solid and liquid phases. The model is very sensitive to all the parameters studied. Despite its several difficulties, the model is popular among regulators and users because of its simplicity compared to research models. It can be used as a screening-level tool in assessing chemical movement in the soil column with considerable site-specific calibrations.

51-536

PCC airfield pavement response during thaw-weakening periods: a field study.

Janoo, V.C., Berg, R.L., SR 96-12, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* May 1996, 38p., ADA-310 423, 13 refs.

Airports, Pavements, Concrete pavements, Cold weather performance, Thaw weakening, Thermocouples, Surface temperature, Subgrades, Loads (forces), United States—Alaska

This investigation is part of CRREL's on-going characterization of pavement performance in seasonal frost areas. As part of the research, CRREL conducted several field studies for the Federal Aviation Administration (FAA) on the response of airport pavements during thaw-weakening periods at three civil airports in Wisconsin where the design freezing index in the area was around 900 to 1100°C-days and frost penetration ranged between 1250 and 2000 mm. This study focused on the performance of Portland Cement Concrete (PCC) pavements during the spring thaw-weakening period. The sites were instrumented with subsurface thermocouples and Falling Weight Deflectometer (FWD) tests were conducted during the spring thaw period at the center of the slab and across the joints. An analysis of the FWD data and backcalculation of the layer moduli using ILLIBACK and WESDEF was conducted. Unique relationships between the FWD deflections and the subgrade modulus and coefficient of subgrade reaction were obtained. Additional relationships were developed using the FWD deflections, PCC thickness and the horizontal tensile stress at the bottom of the PCC layer. A relationship between load transfer across joints and FWD deflections was also developed. On the basis of the relationships obtained in this study, a methodology for evaluating PCC pavements during spring thaw was developed. However, this methodology needs to be verified for other subgrade types and areas with other design freezing indices.

51-537

Soil physical environment and root growth in northern climates.

Brar, G.S., Reynolds, C.M., SR 96-13, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* May 1996, 23p., ADA-311 060, Refs. p.17-23.

Roots, Plant physiology, Plants (botany), Models, Mathematical models, Arctic landscapes, Soil temperature, Soil water

Understanding the growth and function of plant roots in cold climates is critical, but examination of root systems to elucidate their link to production is expensive and labor-intensive. Limited information is available on the root growth and functions of plants grown in northern climates. The objective is to present an overview of the influence of physical edaphic factors on plant root systems with special emphasis on models that are available for simulating root growth. This report summarizes the impact of the soil physical environment (soil water, soil temperature, soil air, physical impedance, and spatial variability) on root uptake and growth. Roots grow because new cells are formed in the meristematic tissue near the root tip, and these newly formed cells increase in volume, pushing the root tip forward if growth conditions are satisfactory. Rapid elongation of primary roots, combined with well-developed secondary roots, allows the plants to exploit moisture and nutrients from a greater soil volume. Root and shoots are strongly interdependent. The roots receive photosynthates and growth hormones from shoots and in return furnish water and nutrients to the shoots. Several root growth models have been developed during the past decade; however, none addresses the problems associated with cold regions. The models reported in the literature can be classified as 1) simple models, 2) carbon partition models, 3) growing degree day-based models, 4) soil parameter-based models, and 5) arctic plant growth models.

51-538

Glaciers and environment in the Qinghai-Xizang (Tibet) Plateau (I)—the Gongga Mountain.

Xie, Z.C., ed, Kotliakov, V.M., ed, Reports on the Sino-Russian Joint Glaciological Expedition, Beijing, Science Press, 1994, 201p., WDCA 95000505, Refs. passim. For individual papers see 51-539 through 51-555.

Mountain glaciers, Glacier surveys, Glacial meteorology, Glacier alimentation, Glacier ablation, Glacier heat balance, Glacier mass balance, Glacier oscillation, China—Gongga, Mount

51-539

Existing conditions of the southeastern Tibet glacier.

Aĭzin, V.B., Loktionova, E.M., Glaciers and environment in the Qinghai-Xizang (Tibet) Plateau (I)—the Gongga Mountain. Edited by Z.C. Xie and V.M. Kotliakov, Beijing, Science Press, 1994, p.1-28, 16 refs.

Mountain glaciers, Glacier surveys, Glacial meteorology, Glacier alimentation, Glacier heat balance, Glacier mass balance, Climatic factors, Atmospheric circulation, China—Gongga, Mount

51-540

Climatic features in the Gongga Mountain.

Gao, S.H., Peng, J.W., Glaciers and environment in the Qinghai-Xizang (Tibet) Plateau (I)—the Gongga Mountain. Edited by Z.C. Xie and V.M. Kotliakov, Beijing, Science Press, 1994, p.29-38, 10 refs.

Mountain glaciers, Glacier surveys, Glacial meteorology, Glacier mass balance, Glacier alimentation, Snow line, Climatic factors, Atmospheric circulation, Precipitation (meteorology), China—Gongga, Mount

51-541

Characteristics of stream runoff in the Gongga Mountain.

Cheng, G.W., Cao, Z.T., Glaciers and environment in the Qinghai-Xizang (Tibet) Plateau (I)—the Gongga Mountain. Edited by Z.C. Xie and V.M. Kotliakov, Beijing, Science Press, 1994, p.39-46.

Mountain glaciers, Glacial hydrology, Meltwater, Runoff, Stream flow, Glacial rivers, River flow, Glacial meteorology, Precipitation (meteorology), China—Gongga, Mount

51-542

Snow-firn transition and ice formation of the Hailuogou Glacier.

Shi, A.P., Huang, M.H., Glaciers and environment in the Qinghai-Xizang (Tibet) Plateau (I)—the Gongga Mountain. Edited by Z.C. Xie and V.M. Kotliakov, Beijing, Science Press, 1994, p.47-56, 6 refs.

Mountain glaciers, Glacier surveys, Glacier formation, Glacier alimentation, Snowdrifts, Avalanche deposits, Precipitation (meteorology), Snow ice interface, Firn stratification, China—Gongga, Mount

51-543

Temperature regime of Hailuogou Glacier in the Gongga Mountain.

Su, Z., Song, G.P., Liu, S.Y., Wang, N.L., Glaciers and environment in the Qinghai-Xizang (Tibet) Plateau (I)—the Gongga Mountain. Edited by Z.C. Xie and V.M. Kotliakov, Beijing, Science Press, 1994, p.57-64, 3 refs.

Mountain glaciers, Glacier surveys, Glacier heat balance, Glacier ice, Ice temperature, Thermal regime, China—Gongga, Mount

51-544

Accumulation, ablation and ice formation of Hailuogou Glacier in the Gongga Mountain.

Liu, S.Y., Xie, Z.C., Su, Z., Song, G.P., Wang, N.L., Glaciers and environment in the Qinghai-Xizang (Tibet) Plateau (I)—the Gongga Mountain. Edited by Z.C. Xie and V.M. Kotliakov, Beijing, Science Press, 1994, p.65-80, 8 refs.

Mountain glaciers, Glacier surveys, Glacial hydrology, Glacier mass balance, Glacier alimentation, Glacier ablation, Snow ice interface, Firn stratification, China—Gongga, Mount

51-545

Autumn radiation balance in the ablation area of Hailuogou Glacier in the Gongga Mountain.

Xie, Y.Q., Glaciers and environment in the Qinghai-Xizang (Tibet) Plateau (I)—the Gongga Mountain. Edited by Z.C. Xie and V.M. Kotliakov, Beijing, Science Press, 1994, p.81-93, 2 refs.

Mountain glaciers, Glacier surveys, Glacial meteorology, Glacier heat balance, Glacier ablation, Radiation balance, China—Gongga, Mount

51-546

Autumn heat balance in the ablation area of Hailuogou Glacier.

Xie, Y.Q., Glaciers and environment in the Qinghai-Xizang (Tibet) Plateau (I)—the Gongga Mountain. Edited by Z.C. Xie and V.M. Kotliakov, Beijing, Science Press, 1994, p.94-109, 2 refs.

Mountain glaciers, Glacier surveys, Glacial meteorology, Glacier heat balance, Glacier ablation, Ice air interface, Mathematical models, China—Gongga, Mount

51-547

Movement features of Hailuogou Glacier in the Gongga Mountain.

Song, G.P., Glaciers and environment in the Qinghai-Xizang (Tibet) Plateau (I)—the Gongga Mountain. Edited by Z.C. Xie and V.M. Kotliakov, Beijing, Science Press, 1994, p.110-120, 2 refs.

Mountain glaciers, Glacier surveys, Glacier flow, Glacier oscillation, Statistical analysis, China—Gongga, Mount

51-548

Model of the dynamics of the Hailuogou Glacier (southeastern Xizang).

Aĭzin, V.B., Nikitin, S.A., Song, G.P., Glaciers and environment in the Qinghai-Xizang (Tibet) Plateau (I)—the Gongga Mountain. Edited by Z.C. Xie and V.M. Kotliakov, Beijing, Science Press, 1994, p.121-132, 5 refs.

Mountain glaciers, Glacier surveys, Glacial meteorology, Glacier mass balance, Glacier thickness, Glacier flow, Glacier oscillation, Radio echo soundings, Mathematical models, China—Gongga, Mount

51-549

Differences of climatic conditions between the glacial and ice-free areas in Hailuogou in the Gongga Mountain at the end of autumn.

Wang, N.L., Su, Z., Xie, Y.Q., Glaciers and environment in the Qinghai-Xizang (Tibet) Plateau (I)—the Gongga Mountain. Edited by Z.C. Xie and V.M. Kotliakov, Beijing, Science Press, 1994, p.133-142, 2 refs.

Mountain glaciers, Glacier surveys, Glacial meteorology, Glacier ablation, Glacier oscillation, Air temperature, Humidity, China—Gongga, Mount

51-550

Preliminary analyses of hydrological characteristics of Hailuogou Glacier on the eastern slope of the Gongga Mountain.

Cao, Z.T., Cheng, G.W., Glaciers and environment in the Qinghai-Xizang (Tibet) Plateau (I)—the Gongga Mountain. Edited by Z.C. Xie and V.M. Kotliakov, Beijing, Science Press, 1994, p.143-156, 2 refs.

Mountain glaciers, Glacier surveys, Glacial hydrology, Glacial meteorology, Glacier ablation, Subglacial drainage, Glacial rivers, Meltwater, Runoff, China—Gongga, Mount

51-551

Isotope measurement of precipitation in the glaciation system with monsoonal type of feeding (on the southeastern Qinghai-Xizang Plateau).

Aĭzin, V.B., Loktionova, E.M., Martma, T., Glaciers and environment in the Qinghai-Xizang (Tibet) Plateau (I)—the Gongga Mountain. Edited by Z.C. Xie and V.M. Kotliakov, Beijing, Science Press, 1994, p.157-164, 8 refs.

Mountain glaciers, Glacier surveys, Glacial meteorology, Glacier alimentation, Precipitation (meteorology), Atmospheric circulation, Atmospheric composition, Isotope analysis, China—Gongga, Mount

51-552

Studies of recent fluctuations of glacier length in the Gongga Mountain.

Su, Z., Liu, S.Y., Wang, N.L., Shi, A.P., Glaciers and environment in the Qinghai-Xizang (Tibet) Plateau (I)—the Gongga Mountain. Edited by Z.C. Xie and V.M. Kotliakov, Beijing, Science Press, 1994, p.165-173, 5 refs.

Mountain glaciers, Glacier surveys, Glacial meteorology, Glacier oscillation, Moraines, Climatic changes, Paleoclimatology, China—Gongga, Mount

51-553

Quaternary glacial remains and Ice Age series in the region of the Gongga Mountain.

Chen, F.B., Glaciers and environment in the Qinghai-Xizang (Tibet) Plateau (I)—the Gongga Mountain. Edited by Z.C. Xie and V.M. Kotliakov, Beijing, Science Press, 1994, p.174-185, 20 refs.

Mountain glaciers, Glacier surveys, Alpine glaciation, Glacial geology, Geological surveys, Glacial deposits, Moraines, Lacustrine deposits, Quaternary deposits, Paleobotany, Geochronology, Paleoclimatology, China—Gongga, Mount

51-554

Quaternary glaciation on the western slope of the Gongga Mountain.

Ma, Q.H., Glaciers and environment in the Qinghai-Xizang (Tibet) Plateau (I)—the Gongga Mountain. Edited by Z.C. Xie and V.M. Kotliakov, Beijing, Science Press, 1994, p.186-194, 7 refs.

Mountain glaciers, Glacier surveys, Alpine glaciation, Glacial geology, Glacial deposits, Moraines, Quaternary deposits, Snow line, Geochronology, Paleoclimatology, China—Gongga, Mount

51-555

Forest history and climatic fluctuation during the past 2000 years in Hailuo Valley of the Gongga Mountain.

Liu, G.X., Glaciers and environment in the Qinghai-Xizang (Tibet) Plateau (I)—the Gongga Mountain. Edited by Z.C. Xie and V.M. Kotliakov, Beijing, Science Press, 1994, p.195-201, 3 refs.

Plant ecology, Vegetation patterns, Revegetation, Forest ecosystems, Paleobotany, Palynology, Paleoclimatology, China—Gongga, Mount

51-556

Greenland.

Weidick, A., *U.S. Geological Survey. Professional paper,* 1995, No.1386-C, Satellite image atlas of glaciers of the world. Edited by R.S. Williams, Jr., and J.G. Ferrigno, 141p., WDCA 95000474, Refs. p.102-105.

Ice sheets, Glacier surveys, Topographic surveys, Glacier oscillation, Glacier mass balance, Glacier thickness, Snow line, Calving, Glacial lakes, Ice-bound lakes, Lake bursts, Spaceborne photography, Greenland

51-557

Acoustic emission during fatigue experiments on first year sea ice.

Langhorne, P.J., Haskell, T.G., *Cold regions science and technology,* July 1996, 24(3), p.237-250, 45 refs.

Oceanography, Sea ice, Ice mechanics, Fatigue (materials), Ice solid interface, Dynamic loads, Ice deformation, Ice acoustics, Wave propagation, Cracking (fracturing), Acoustic measurement, Mechanical tests, Spectra, Antarctica—McMurdo Station

Acoustic emission events were measured during the cyclic loading of cantilever beams of sea ice sampled from Scott Base, McMurdo Sound. The events were detected with resonant transducers which are predominantly sensitive to the vertically polarized component of the Rayleigh surface wave. This confinement to the surface, along with the linear geometry of the beam, make it possible to estimate a one dimensional source location with only two transducers. The authors define an event magnitude and find this increases as the load increases, with the largest energy release occurring during the fracture of the beam. The measurement of magnitude requires an estimate of the high frequency attenuation of the Rayleigh waves in sea ice. The sources of the events are precursors to the eventual fracture of the sea ice, having highest density at the location of the final failure of the beam. The emissions may originate either from dislocation breakaway or the microcracking associated with this dislocation motion. (Auth. mod.)

51-558

Environmental factors in iceberg collision risks for floating systems.

Fuglem, M., Jordaan, I., Crocker, G.B., Cammaert, G., Berry, B., *Cold regions science and technology,* July 1996, 24(3), p.251-261, 12 refs.

Sea ice distribution, Icebergs, Drift, Velocity measurement, Ice navigation, Ice detection, Ice forecasting, Safety, Impact strength, Statistical analysis, Mathematical models

51-559

2-D frost action modeling using the segregation potential of soils.

Konrad, J.M., Shen, M., *Cold regions science and technology,* July 1996, 24(3), p.263-278, 23 refs.

Frozen ground mechanics, Frozen ground strength, Geocryology, Frost action, Frost heave, Soil water migration, Ice water interface, Ice solid interface, Underground pipelines, Mass transfer, Heat transfer, Stress strain diagrams, Mathematical models

51-560

Analysis of medium scale ice-indentation tests.

Meaney, R., Jordaan, I.J., Xiao, J., *Cold regions science and technology,* July 1996, 24(3), p.279-287, 18 refs.

Sea ice, Ice cover strength, Mechanical tests, Ice solid interface, Ice deformation, Ice creep, High pressure tests, Cracking (fracturing), Dynamic loads, Ice elasticity, Viscous flow, Statistical analysis

51-561

Long-term lake water temperature and ice cover simulations/measurements.

Fang, X., Stefan, H.G., *Cold regions science and technology,* July 1996, 24(3), p.289-304, 21 refs.

Climatology, Limnology, Lake ice, Ice cover thickness, Seasonal freeze thaw, Thermal diffusion, Water temperature, Profiles, Ice water interface, Ice cover effect, Snow accumulation, Ice forecasting, Mathematical models, Simulation

51-562

Application of damage mechanics to ice failure in compression.

Xiao, J., Jordaan, I.J., *Cold regions science and technology,* July 1996, 24(3), p.305-322, 38 refs.

Ice mechanics, Ice models, Mathematical models, Viscoelasticity, Cracking (fracturing), Ice creep, Ice deformation, Ice solid interface, Fracture zones, Dynamic loads, Mechanical tests, Strain tests, Statistical analysis, Thin sections

51-563

Morphology and formation of flow-lobe tumuli on Icelandic shield volcanoes.

Rossi, M.J., Gudmundsson, A., *Journal of volcanology and geothermal research,* Aug. 1996, 72(3-4), p.291-308, 35 refs.

Subarctic landscapes, Geomorphology, Earth crust, Mass flow, Geologic processes, Volcanoes, Magma, Sampling, Lithology, Stratigraphy, Iceland

51-564

Shallow-water receptions from the transarctic acoustic propagation experiment.

Pawlowicz, R., Farmer, D., Sotirin, B., Ozard, S., *Acoustical Society of America. Journal,* Sep. 1996, 100(3), p.1482-1492, 23 refs.

Oceanography, Subpolar regions, Underwater acoustics, Sound transmission, Low frequencies, Ice cover effect, Subglacial observations, Acoustic measurement, Wave propagation, Phase transformations, Water temperature, Temperature effects, Statistical analysis

51-565

Geochemistry of lavas from Mohns Ridge, Norwegian-Greenland Sea: implications for melting conditions and magma sources near Jan Mayen.

Haase, K.M., Devey, C.W., Mertz, D.F., Stoffers, P., Garbe-Schönberg, D., *Contributions to mineralogy and petrology,* Apr. 1996, 123(3), p.223-237, 83 refs.

Marine geology, Ocean bottom, Tectonics, Subpolar regions, Volcanoes, Magma, Melting points, Lithology, Sampling, Geomorphology, Geochemistry, Greenland Sea, Norwegian Sea

51-566

Prince of Wales Formation—post-flood basalt alkali volcanism in the Tertiary of East Greenland.

Brown, P.E., Evans, I.B., Becker, S.M., *Contributions to mineralogy and petrology,* May 1996, 123(4), p.424-434, 30 refs.

Pleistocene, Subarctic landscapes, Nunataks, Volcanoes, Magma, Earth crust, Lithology, Geologic structures, Stratigraphy, Sampling, Geochemistry, Greenland—Prince of Wales Mountains

51-567

Influence of minimal freeze-thaw cycle temperature on the scaling resistance of concrete in the presence of deicer salts. [Influence de la température minimale du cycle de gel-dégel sur la détérioration du béton par écaillage en présence de sels fondants]

Marchand, J., Pigeon, M., Boisvert, L., *Canadian journal of civil engineering,* June 1996, 23(3), p.595-601, In French with English summary. 22 refs.

Concrete admixtures, Physical properties, Freeze thaw cycles, Freeze thaw tests, Freezing points, Temperature effects, Ice removal, Salting, Mechanical tests, Concrete durability, Degradation

51-568

Observational constraints on the formation of type Ia polar stratospheric clouds.

Tabazadeh, A., Toon, O.B., Gary, B.L., Bacmeister, J.T., Shoerberl, M.R., *Geophysical research letters,* Aug. 1, 1996, 23(16), p.2109-2112, 15 refs.

Climatology, Polar atmospheres, Polar stratospheric clouds, Cloud physics, Turbulent boundary layer, Aerial surveys, Synoptic meteorology, Air temperature, Temperature variations, Freezing points, Forecasting, Statistical analysis

51-569

Large ^{13}CO deficit in the lower antarctic stratosphere due to "ozone hole" chemistry: part I, observations.

Brenninkmeijer, C.A.M., et al, *Geophysical research letters,* Aug. 1, 1996, 23(16), p.2125-2128, 20 refs.

Polar atmospheres, Climatic changes, Atmospheric composition, Ozone, Degradation, Condensation, Stratosphere, Aerosols, Carbon isotopes, Radioactive isotopes, Sampling, Isotope analysis, Correlation

Isotope and concentration measurements are reported for CO and CH_4 in air collected in the upper troposphere and lower stratosphere between New Zealand and Antarctica in Oct. 1993. The $^{13}C/^{12}C$ ratio of CO for the stratospheric samples are much lower than all previously reported atmospheric values. The measurements manifest a very steep decrease in $\delta^{13}C$ with declining CO. This large isotope shift is caused by the local production of several ppbv of extremely depleted CO. Not only is CH_4 itself a ^{13}C depleted precursor of CO, but the recently discovered large fractionation in $Cl + CH_4$ and the availability of free Cl during ozone hole conditions causes the effect. (Auth. mod.)

51-570

Large ^{13}CO deficit in the lower antarctic stratosphere due to "ozone hole" chemistry: part II, modeling.

Müller, R., Brenninkmeijer, C.A.M., Crutzen, P.J., *Geophysical research letters,* Aug. 1, 1996, 23(16), p.2129-2132, 26 refs.

Polar atmospheres, Simulation, Cloud physics, Stratosphere, Climatic changes, Aerosols, Heterogeneous nucleation, Degradation, Sampling, Carbon isotopes, Isotope analysis, Correlation, Photochemical reactions, Seasonal variations

Recently, isotopically extremely light CO was found in whole air samples from the antarctic lower stratosphere (Part I). To investigate the cause of these unprecedented observations, a photochemical model is used to simulate the typical history of air masses at polar latitudes in the lowermost stratosphere over austral winter and spring. The model results show that the observations may be explained by the very efficient isotope fractionation in the reaction $R1: CH_4 + Cl \rightarrow HCl + CH_3$. Extremely high levels of Cl atom concentrations prevail in the polar lower stratosphere in austral spring for a period of about 10 days after most ozone is lost. Therefore, R1 becomes very efficient, leading to a very high rate of buildup of HCl and an unusually high isotopic CO fractionation. (Auth. mod.)

51-571

Potential of cirrus clouds for heterogeneous chlorine activation.

Borrmann, S., Solomon, S., Dye, J.E., Luo, B.P., *Geophysical research letters,* Aug. 1, 1996, 23(16), p.2133-2136, 15 refs.

Climatology, Polar atmospheres, Stratosphere, Cloud physics, Ozone, Heterogeneous nucleation, Ice crystal growth, Aerosols, Sampling, Profiles, Spectroscopy

51-572

Evaporation studies of model polar stratospheric cloud films.

Middlebrook, A.M., Tolbert, M.A., Drdla, K., *Geophysical research letters,* Aug. 1, 1996, 23(16), p.2145-2148, 11 refs.

Climatology, Polar atmospheres, Atmospheric composition, Polar stratospheric clouds, Evaporation, Cloud physics, Ice water interface, Ice sublimation, Temperature effects, Aerosols, Water films, Ice spectroscopy, Simulation

51-573

Air-ice-ocean momentum exchange. Part I: energy transfer between waves and ice floes.

Perrie, W., Hu, Y., *Journal of physical oceanography,* Sep. 1996, 26(9), p.1705-1720, 19 refs.

Oceanography, Air ice water interaction, Ice water interface, Ice floes, Ocean waves, Turbulent boundary layer, Turbulent exchange, Wave propagation, Attenuation, Oscillations, Spectra, Ice cover effect, Mathematical models

51-574

Linear equivalent barotropic model of the Antarctic Circumpolar Current with realistic coastlines and bottom topography.

Krupitsky, A., Kamenkovich, V.M., Naik, N., Cane, M.A., *Journal of physical oceanography,* Sep. 1996, 26(9), p.1803-1824, 45 refs.

Oceanography, Ocean currents, Bottom topography, Topographic effects, Fluid dynamics, Wind factors, Mathematical models

A linear equivalent barotropic (EB) model is applied to study the effects of the bottom topography H and baroclinicity on the total transport and the position of the Antarctic Circumpolar Current (ACC). It is shown that the asymptotic behavior of the solution of the barotropic model (a particular case of the EB model) in the limit of very small bottom friction depends on subtle details of topography and basin geometry. The authors conclude that the barotropic model is not robust with respect to possible variations of model topography. The authors found that the EB model reproduces the position and the transport of the ACC reasonably well. The solution is robust with respect to uncertainties in H. The EB model is much improved by a parameterization of the bottom friction via near-bottom velocity, which tends to shut off the flow in the shallow regions. (Auth. mod.)

51-575

Absorption of solar energy in a cryoconite hole.

Podgornyĭ, I.A., Grenfell, T.C., *Geophysical research letters,* Sep. 1, 1996, 23(18), p.2465-2468, 12 refs.

Oceanography, Sea ice, Ice melting, Ice surface, Ponds, Colored ice, Water pollution, Radiation absorption, Radiance, Upwelling, Analysis (mathematics), Ice water interface

51-576

Depletion of atmospheric nitrate and chloride as a consequence of the Toba volcanic eruption.

Yang, Q., Mayewski, P.A., Zielinski, G.A., Twickler, M., Taylor, K.C., *Geophysical research letters,* Sep. 1, 1996, 23(18), p.2513-2516, 31 refs.

Paleoclimatology, Climatic changes, Atmospheric composition, Degradation, Photochemical reactions, Aerosols, Volcanic ash, Ice sheets, Ice cores, Sampling, Ion density (concentration), Correlation, Sumatra—Toba, Greenland

51-577

On the interpretation of subglacial till fabric.

Hicock, S.R., Goff, J.R., Lian, O.B., Little, E.C., *Journal of sedimentary research A,* Sep. 1996, 66(5), p.928-934, 65 refs.

Glacial geology, Pleistocene, Subglacial observations, Glacial deposits, Sedimentation, Lithology, Shear stress, Striations, Ice solid interface, Ice melting, Deformation, Statistical analysis

51-578

Seasonal recession of Martian south polar cap: 1992 HST observations.

James, P.B., Clancy, R.T., Lee, S.W., Martin, L.J., Bell, J., *Icarus,* Sep. 1996, 123(1), p.87-100, 18 refs.

Mars (planet), Planetary environments, Polar regions, Extraterrestrial ice, Ice sheets, Ice edge, Albedo, Carbon dioxide, Seasonal variations, Imaging, Stereophotography, Photometry

51-579

Cooling rate of a liquid shell in Titan's interior.

Grasset, O., Sotin, C., *Icarus,* Sep. 1996, 123(1), p.101-112, 38 refs.

Satellites (natural), Extraterrestrial ice, Regolith, Hydrates, Viscosity, Ice cover thickness, Cooling rate, Ice water interface, Phase transformations, Radioactivity, Hydrogeochemistry, Simulation

51-580

Heliolitine corals of the upper Duoro Formation (Upper Silurian), Canadian arctic islands.

Dixon, O.A., *Journal of paleontology,* Sep. 1996, 70(5), p.718-740, Refs. p.738-740.

Marine biology, Paleoecology, Sediments, Sampling, Fossils, Structural analysis, Distribution, Classifications, Biogeography, Canada—Northwest Territories—Somerset Island

51-581

Ice accretion on a radial inflow turbine blade.

Hefazi, H., Kaups, K., Murry, R., *Journal of turbomachinery,* July 1996, 118(3), p.606-612, 6 refs.

Aircraft icing, Air flow, Turbulent flow, Ducts, Propellers, Surface temperature, Heat balance, Ice accretion, Ice formation, Cloud droplets, Ice air interface, Shear stress, Mathematical models, Ice forecasting

51-582

Dye site snow drift tests series I.

Keitz, E.L., New York University. College of Engineering. Research Division. Progress report 741.02, New York, 1960, 18p.+ appends., Contract No. DA-11-190-ENG-88, 2 refs.

Cold weather construction, Buildings, Models, Snow fences, Snowdrifts, Blowing snow, Wind direction, Wind factors, Snow accumulation, Wind tunnels, Simulation, Cold weather tests, Snow stakes

51-583

Primary production, nutrient dynamics and mineralisation in a northeastern Greenland fjord during the summer thaw.

Rysgaard, S., Finster, K., Dahlgaard, H., *Polar biology,* Aug. 1996, 16(7), p.497-506, 59 refs.

Marine biology, Biomass, Estuaries, Ecosystems, Nutrient cycle, Sedimentation, Ice breakup, Seasonal freeze thaw, Sampling, Geochemical cycles, Ice cover effect, Greenland—Young Sound

51-584

Evaluation of the air void analyzer.

Magura, D.D., *Concrete international,* Aug. 1996, 18(8), p.55-59, 8 refs.

Concrete strength, Physical properties, Concrete admixtures, Frost resistance, Air entrainment, Bubbles, Standards, Mechanical tests, Measuring instruments, Performance

51-585

Applicability of regular particle shapes in light scattering calculations for atmospheric ice particles.

Macke, A., Mishchenko, M.I., *Applied optics,* July 20, 1996, 35(21), p.4291-4296, 22 refs.

Climatology, Cloud physics, Optical properties, Light scattering, Wave propagation, Ice crystal optics, Ice crystal structure, Ice crystal size, Orientation, Radiation absorption, Models, Statistical analysis

51-586

^{137}Cs in bottom sediments in the western part of the Kara Sea.

Aĭbulatov, N.A., Sapozhnikov, IU.A., Plishkin, A.N., Politova, N.V., Sapozhnikova, L.D., *Russian Academy of Sciences. Transactions. Earth science sections,* Nov. 1995, 336(4), p.144-147, Translated from Rossiĭskaia akademiia nauk. Doklady. 4 refs.

Oceanography, Bottom sediment, Radioactive wastes, Waste disposal, Water pollution, Soil pollution, Radioactivity, Isotope analysis, Sampling, Environmental tests, Russia—Kara Sea

51-587

Staged pavement design, a Danish construction practice.

Jansen, J.M., Denmark. Vejdirektoratet. Vejteknisk Institut. Notat 256, Copenhagen, 1995, 14p., With Danish summary. 2 refs.

Pavements, Pavement bases, Subgrades, Bituminous concretes, Bearing strength, Structural analysis, Elastic properties, Design criteria, Mechanical tests

51-588

Ambiguity problems in constructing a seismic crustal model for the southeastern Barents Sea.

Morozova, E.A., Pavlenkova, N.I., Herbst, R., *Physics of the solid earth,* Sep. 1995, 31(2), p.164-174, Translated from Fizika zemli. 18 refs.

Marine geology, Oceanographic surveys, Ocean bottom, Earth crust, Tectonics, Seismic surveys, Seismic reflection, Sounding, Profiles, Barents Sea

51-589

Autocorrelation in seasonal variation series of river runoff.

Ivanova, L.V., *Water resources,* Sep.-Oct. 1996, 23(5), p.489-498, Translated from Vodnye resursy. 5 refs.

Hydrology, River basins, River flow, Runoff, Snowmelt, Seasonal variations, Statistical analysis, Correlation, Flood forecasting

51-590

Periodicity of storm surges in the Bering Sea from 1898 to 1993, based on newspaper accounts.

Mason, O.K., Salmon, D.K., Ludwig, S.L., *Climatic change,* Sep. 1996, 34(1), p.109-123, 54 refs.

Climatology, Climatic changes, Oceanography, Sea level, Storms, Marine meteorology, Wind factors, Surface temperature, Periodic variations, Statistical analysis, Bering Sea

51-591

***Mesopedinella arctica* gen. et sp. nov. (Pedinellales, Dictyochophyceae). I: Fine structure of a new marine phytoflagellate from arctic Canada.**

Daugbjerg, N., *Phycologia,* Sep. 1996, 35(5), p.435-445, 33 refs.

Marine biology, Plankton, Sampling, Classifications, Structural analysis, Microstructure, Scanning electron microscopy, Canada—Northwest Territories—Foxe Basin

51-592

Molecular dynamics study of single-particle motion in supercooled water. Memory function approach and comparison with quasi-elastic neutron scattering.

Di Cola, D., Deriu, A., Sampoli, M., *Physica B,* Aug. 1, 1996, 226(1-3), International Workshop on Quasielastic Neutron Scattering, Parma, Italy, Sep. 7-8, 1995, p.46-50, 24 refs.

Water structure, Supercooling, Liquid cooling, Molecular energy levels, Molecular structure, Proton transport, Neutron scattering, Simulation, Correlation, Spectra

51-593

Debris transport paths and sediment flux through the Grinnell Ice Cap, Frobisher Bay, Baffin Island, N.W.T., Canada.

Dowdeswell, J.A., Boulder, University of Colorado, 1982, 167p., WDCA 95000276, M.A. thesis. Refs. p.153-167.

Glacial geology, Glacial erosion, Glacier beds, Glacier friction, Glacial deposits, Glacial till, Moraines, Talus, Outwash, Sediment transport, Canada—Northwest Territories—Baffin Island

51-594

Investigation of the 1991-1993 mass balance and summer ablation, with past climatological and ablation relationships studies on the Arikaree Glacier, Front Range, Colorado.

Barreto, H.L., Boulder, University of Colorado, 1994, 137p., WDCA 95000007, M.A. thesis. Refs. p.131-134.

Mountain glaciers, Cirque glaciers, Glacier surveys, Glacial meteorology, Glacier mass balance, Glacier alimentation, Glacier ablation, Glacier oscillation, Global change, Statistical analysis, United States—Colorado—Front Range

51-595

Investigation into the nature of the physical mechanisms responsible for the major synoptic systems in the eastern Canadian Arctic in the winter and summer of 1973.

LeDrew, E.F., Boulder, University of Colorado, 1976, 172p. + appends., WDCA 95000269, Ph.D. thesis. Refs. p.164-172.

Polar atmospheres, Marine meteorology, Synoptic meteorology, Atmospheric circulation, Atmospheric pressure, Atmospheric disturbances, Weather forecasting, Computer programs, Mathematical models, Statistical analysis, Canada—Northwest Territories—Baffin Island, Baffin Bay, Davis Strait

51-596

Climate succession and glacial history of the Southern Hemisphere over the past five million years.

Quilty, P.G., ed, *Australian National Antarctic Research Expeditions. ANARE research notes,* Oct. 1995, No.94, 39p., Refs. passim.

Glacial geology, Glaciation, Paleoclimatology, Ice sheets, Glacier oscillation, Climatic changes, Sea ice, Limnology, Geochronology, Fossils

This is a collection of abstracts of papers presented at a symposium convened by the Tasmanian Division of the Australian and New Zealand Association for the Advancement of Science. The symposium was based on greatly enhanced knowledge of the Cenozoic glacial record in Tasmania, and development in Tasmania of a research focus into the evolution of the Late Neogene record in Antarctica through geological and glaciological research.

51-597

NSIDC notes, issue No.18, summer 1996.

National Snow and Ice Data Center, Boulder, CO, 1996, 6p.

LANDSAT, Data transmission, Mapping, Velocity measurement, Ice sheets, Sea ice distribution, Weather stations, Antarctica—West Antarctica

The notes pertinent to Antarctica in this issue deal with a Landsat project to map ice velocities of West Antarctica; and a focused program of sea ice motion studies using instrumented buoys deployed on ice floes in the southern ocean, as near to the antarctic coastline as possible.

51-598

Role of the Antarctic in global change: an international plan for a regional research programme.

SCAR Steering Committee, Cambridge, U.K., Scientific Committee on Antarctic Research (SCAR), 1993, 54p., Prepared by the SCAR Steering Committee for the IGBP in Aug. 1992. 9 refs.

Global change, Paleoclimatology, Research projects, Ice cores, Ozone, Ice cover thickness, Air ice water interaction, Glacier oscillation, Paleoecology, Sea ice

This document follows one published by the ICSU Press and SCAR in 1989 entitled "The Role of Antarctica in Global Change". In that earlier document the reasons for conducting global change research in Antarctica were outlined in general terms. The present document provides a blueprint for action and is based on the deliberations at a SCAR-sponsored workshop which took place at the Alfred Wegener Institute in Bremerhaven, Germany, Sep. 18-21, 1991. The concept of "core" projects and regional networks was adopted in the design of the global change research program for Antarctica, outlined in this report. Six core projects were identified, which are discussed in detail: the antarctic sea-ice zone: interactions and feedbacks within the global geosphere-biosphere system; global palaeoenvironmental records from the antarctic ice sheet and marine and land sediments; the mass balance of the antarctic ice sheet and sea level; antarctic stratospheric ozone, tropospheric chemistry, and the effects of UV on the biosphere; the role of the antarctic in biogeochemical cycles and exchanges: atmosphere and ocean; and environmental monitoring and detection of global change in Antarctica.

51-599

Sea ice thickness observations from East Antarctica.

Worby, T., *Bureau of Meteorology Research Center. BMRC research report,* 1994, No.42, p.55-58, 4 refs.

Sea ice distribution, Ice cover thickness, Pack ice, Ice edge, Ice water interface, Charts, Antarctica—East Antarctica

Between Oct. 1986 and May 1993 ship-based sea ice observations were kept on 17 voyages in the area of East Antarctica. To examine regional and seasonal differences in ice conditions the authors have divided the data into 3 sectors: I (60-90°E), II (90-120°E) and III (120-150°E), and further subdivided these sectors into 5 zones between the ice edge and the antarctic continent. These zones are 0-50 km, 50-150 km, 150-350 km, 350-550 km and >550 km from the ice edge. They have also simplified the ship-based observations into 4 thickness categories based on important phases in the ice growth cycle. The extremes of ice thickness found within the antarctic pack are important for different reasons. Thin ice (<0.3 m) is crucial to the exchange of heat between the ocean and atmosphere and thick ice (>1 m) contains the bulk of the ice mass within the pack. The area-averaged ice thickness has been calculated for the undeformed and ridged component of the pack which typically comprises 70-80% of the total area in each sector.

51-600

Guide to environmental services.

Warrenfeltz, L., Washington, D.C., National Ice Center, 1995, var. p.

Mapping, Sea ice, Ice sheets, Ice navigation, Snow, Meteorological factors, Spaceborne photography, Meteorological data, Data processing, Manuals

This handbook provides a brief overview of the environmental conditions typical of the Arctic and Antarctica, and an in-depth summary of the products and services available from the National Ice Center (NIC). Information regarding the availability of meteorological and oceanographic (METOC) products for the polar regions from Commander, Naval Meteorology and Oceanography Command (CNMOC) regional forecast centers is also included. The topics covered by this publication include: a brief description of the polar marine environment; a discussion of sea ice and its stages of development; an overview of the data sources incorporated into NIC products; and an overview of environmental products and services available from NIC, complimentary products from CNMOC regional forecast centers, products and services, request procedures, and dissemination means.

51-601

Wavelet analysis and visualization of the formation and evolution of low total ozone events over northern Sweden.

Weinberg, B.L., Drayson, S.R., Freese, K., *Geophysical research letters,* Aug. 15, 1996, 23(17), p.2223-2226, 13 refs.

Climatology, Subpolar regions, Atmospheric composition, Degradation, Ozone, Spectroscopy, Mapping, Periodic variations, Spectra, Sweden

51-602

Ice core data of atmospheric carbon monoxide over Antarctica and Greenland during the last 200 years.

Haan, D., Martinerie, P., Raynaud, D., *Geophysical research letters*, Aug. 15, 1996, 23(17), p.2235-2238, 27 refs.

Climatology, Climatic changes, Polar atmospheres, Atmospheric composition, Air pollution, Ice sheets, Ice cores, Sampling, Aerosols, Periodic variations, Greenland, Antarctica—East Antarctica

The first polar ice core measurements of carbon monoxide compatible with atmospheric data were obtained using an improved experimental protocol. A new CO extraction method has been developed with special care to eliminate any CO contamination. The procedure has been applied to ice core samples originating from Antarctica and Greenland in order to reconstruct past CO variations over the last 200 years. Consistent results in terms of atmospheric concentrations are obtained. The authors found that CO concentration started to increase over Greenland around 1850; by contrast, CO levels at high southern latitudes remained fairly constant between 1860 and 1916. Based on available data on past CO sources, a scenario is proposed for the CO increase observed in Greenland. In addition, these Greenland CO results suggest that simulations of preindustrial CO distribution could have underestimated CO concentrations mainly in the Northern Hemisphere leading to an overestimate of the change since preindustrial times, and to an underestimate of the past interhemispheric gradient of carbon monoxide. (Auth. mod.)

51-603

Distinctive ozone structure in the high-latitude stratosphere: measurements by the Millimeter-wave Atmospheric Sounder.

Olivero, J.J., et al, *Geophysical research letters*, Aug. 15, 1996, 23(17), p.2309-2311, 13 refs.

Climatology, Polar atmospheres, Atmospheric composition, Aerosols, Stratosphere, Turbulent diffusion, Ozone, Sounding, Profiles, Radiometry, Antarctica—Amundsen-Scott Station

MAS (Millimeter-wave Atmospheric Sounder) observations from the shuttle ATLAS spacelab pallet have revealed some little known structure in stratospheric ozone mixing ratio profiles at sub-polar latitudes of both hemispheres. Qualitatively similar features are observed by UARS instruments. Another possibly related feature has been observed by ground-based remote sensing from the South Pole over an extended season. In all these cases, it seems likely that active photochemistry and highly structured horizontal and vertical transport play important roles. Some evidence of a similar feature is also present in a current 2-D photochemical model. (Auth. mod.)

51-604

Space-borne H_2O observations in the arctic stratosphere and mesosphere in the spring of 1992.

Aellig, C.P., et al, *Geophysical research letters*, Aug. 15, 1996, 23(17), p.2325-2328, 12 refs.

Climatology, Polar atmospheres, Atmospheric composition, Water vapor, Subsidence, Sounding, Radiometry, Turbulent diffusion

51-605

ATMOS/ATLAS-3 observations of long-lived tracers and descent in the antarctic vortex in November 1994.

Abrams, M.C., et al, *Geophysical research letters*, Aug. 15, 1996, 23(17), p.2341-2344, 12 refs.

Polar atmospheres, Stratosphere, Aerosols, Subsidence, Atmospheric composition, Radiometry, Turbulent diffusion, Sounding

Observations of the long-lived tracers N_2O, CH_4 and HF obtained by the Atmospheric Trace Molecule Spectroscopy (ATMOS) instrument in early Nov. 1994 are used to estimate average descent rates during winter in the antarctic polar vortex of 0.5 to 1.5 km/month in the lower stratosphere, and 2.5 to 3.5 km/month in the middle and upper stratosphere. Descent rates inferred from ATMOS tracer observations agree well with theoretical estimates obtained using radiative heating calculations. Strong horizontal gradients of tracer mixing ratios, the presence of mesospheric air in the vortex in early spring, and the variation with altitude of inferred descent rates indicate that the antarctic vortex is highly isolated from mid-latitudes throughout the winter from approximately 20 km to the stratopause. The 1994 antarctic vortex remained well isolated between 20 and 30 km through at least mid-Nov. (Auth. mod.)

51-606

Trace gas transport in the arctic vortex inferred from ATMOS ATLAS-2 observations during April 1993.

Abrams, M.C., et al, *Geophysical research letters*, Aug. 15, 1996, 23(17), p.2345-2348, 14 refs.

Polar atmospheres, Stratosphere, Turbulent diffusion, Aerosols, Profiles, Subsidence, Spectroscopy

51-607

ATMOS/ATLAS-3 measurements of stratospheric chlorine and reactive nitrogen partitioning inside and outside the November 1994 antarctic vortex.

Rinsland, C.P., et al, *Geophysical research letters*, Aug. 15, 1996, 23(17), p.2365-2368, 16 refs.

Polar atmospheres, Stratosphere, Atmospheric composition, Aerosols, Subsidence, Sounding, Photometry, Turbulent diffusion, Models, Photochemical reactions

Partitioning between HCl and $ClONO_2$ and among the main components of the reactive nitrogen family has been studied inside and outside the antarctic stratospheric vortex based on ATMOS profiles measured at sunrise during the Nov. 3-12, 1994 ATLAS-3 Shuttle mission. Model calculations reproduce the higher levels of HCl and NO_x ($NO + NO_2$) inside the lower stratospheric vortex both driven by photochemical processes initiated by low O_3. The high HCl at low O_3 results from chemical production of HCl via the reaction of enhanced Cl with CH_4, limited production of $ClONO_2$, and the descent of inorganic chlorine from higher altitudes. (Auth. mod.)

51-608

ATMOS stratospheric deuterated water and implications for troposphere-stratosphere transport.

Moyer, E.J., Irion, F.W., Yung, Y.L., Gunson, M.R., *Geophysical research letters*, Aug. 15, 1996, 23(17), p.2385-2388, 24 refs.

Climatology, Cloud physics, Stratosphere, Spectroscopy, Water vapor, Atmospheric composition, Isotope analysis, Ice crystals, Ice sublimation, Climatic factors

51-609

ATMOS measurements of H_2O+2CH_4 and total reactive nitrogen in the November 1994 antarctic stratosphere: dehydration and denitrification in the vortex.

Rinsland, C.P., et al, *Geophysical research letters*, Aug. 15, 1996, 23(17), p.2397-2400, 24 refs.

Polar atmospheres, Stratosphere, Atmospheric composition, Aerosols, Polar stratospheric clouds, Degradation, Desiccation, Condensation, Photometry, Turbulent diffusion

Simultaneous stratospheric volume mixing ratios measured inside and outside the antarctic vortex by the Atmospheric Trace Molecule Spectroscopy (ATMOS) instrument in Nov. 1994 reveal previously unobserved features in the distributions of total reactive nitrogen and total hydrogen. Maximum removal of NO_y due to sedimentation of polar stratospheric clouds (PSCs) inside the vortex occurred at a potential temperature of 500-525 K, where values were 5 times smaller than measurements outside. Maximum loss of H_2O+2CH_4 due to PSCs occurred in the vortex at 425-450 K. The antarctic and Apr. 1993 arctic measurements by ATMOS show no significant differences in volume mixing ratios outside the vortices in the two hemispheres. (Auth. mod.)

51-610

Stratospheric meteorological conditions for the 3-12 Nov 1994 ATMOS/ATLAS-3 measurements.

Manney, G.L., Swinbank, R., O'Neill, A., *Geophysical research letters*, Aug. 15, 1996, 23(17), p.2409-2412, 11 refs.

Polar atmospheres, Climatology, Atmospheric circulation, Air temperature, Stratosphere, Polar stratospheric clouds, Spectroscopy

During the ATLAS-3 mission (Nov. 3-12, 1994) United Kingdom Meteorological Office fields show that the Southern Hemisphere (SH) vortex was still strong below about 700 K, with coherent vortex fragments apparent up to about 1300 K. The SH vortex was shifted off the pole toward 270°E throughout ATLAS-3, although its shape varied from day to day. SH temperatures were increasing during ATLAS-3; temperatures below 188 K were last seen 35-45 days before the mission, but were below 195 K as late as Nov. 2, 1994. The Northern Hemisphere (NH) polar vortex had developed at levels above about 550 K. Simulated high-resolution potential vorticity fields clearly show low latitude air being drawn up around the polar vortices in both hemispheres. These fields indicate that meteorological analyses underestimate the amount of atmospheric variability, including the strength of local PV gradients, and small-scale structure. (Auth. mod.)

51-611

Coarse bed load transport in a glacial valley, Sermilik, South East Greenland.

Busskamp, R., Hasholt, B., *Zeitschrift für Geomorphologie*, Sep. 1996, 40(3), p.349-358, With German and French summaries. 19 refs.

Glacial geology, Subarctic landscapes, Glacial hydrology, Glacier beds, Glacial rivers, Sampling, Sediment transport, Glacial erosion, Grain size, Geomorphology, Landscape development, Greenland—Mitdluagkat Glacier

51-612

Old cryogenic structures of Northern Patagonia: the Cryomere Penfordd.

Trombotto, D., *Zeitschrift für Geomorphologie*, Sep. 1996, 40(3), p.385-399, With German and French summaries. 30 refs.

Geocryology, Earth crust, Quaternary deposits, Cryogenic structures, Sedimentation, Classifications, Periglacial processes, Ice wedges, Cryoturbation, Freeze thaw cycles, Argentina—Patagonia

51-613

Effects of de-icing salt on ground water characteristics.

O'Brien, J.E., Majewski, J.C., *Environmental letters*, 1975, 8(4), p.303-313, 4 refs.

Water supply, Wells, Water pollution, Road icing, Salting, Runoff, Ground water, Chemical properties, Ion density (concentration), Environmental impact, Statistical analysis

51-614

***In-situ* x-ray topographic observations of notches in ice.**

Hu, X., Baker, I., Dudley, M., *Scripta materialia*, Feb. 1, 1996, 34(3), p.491-497, 21 refs.

Ice physics, Ice mechanics, Stress concentration, Ice deformation, Plastic deformation, Ice crystal structure, Ice microstructure, Orientation, Defects, X ray analysis, Topographic features

51-615

Mid-latitude noctilucent cloud observations by lidar.

von Cossart, G., Hoffmann, P., von Zahn, U., Keckhut, P., Hauchecorne, A., *Geophysical research letters*, Oct. 15, 1996, 23(21), p.2919-2922, 13 refs.

Cloud cover, Cloud physics, Optical phenomena, Profiles, Lidar, Backscattering, Detection, Sounding, Ice crystal optics, Particle size distribution

51-616

On the use of carbon tetrachloride as a transient tracer of Weddell Sea deep and bottom waters.

Meredith, M.P., Van Scoy, K.A., Watson, A.J., Locarnini, R.A., *Geophysical research letters*, Oct. 15, 1996, 23(21), p.2943-2946, 22 refs.

Oceanography, Ocean currents, Ventilation, Geochemistry, Aerosols, Turbulent diffusion, Sampling, Antarctica—Weddell Sea

Antarctic bottom waters have long been known to be a mixture of Circumpolar Deep Water and Shelf Water. Recent observations show that in the antarctic bottom waters of the Scotia Sea and northern Weddell Sea, the ratios of carbon tetrachloride (CCl_4) to chlorofluorocarbons (CFC-11, 12) are inconsistent with the ratios observed in the surface layer of the Weddell Sea. This is the result of a deficit of CCl_4 in the bottom waters, and renders the compound unsuitable for use as a transient tracer from which apparent ages can be derived directly. The summer near-surface temperature minimum of Antarctic Surface Water exhibits a similar inconsistency, demonstrating that CCl_4 can be removed from cold waters with high oxygen levels, probably through a biological process. It is inferred that Shelf Water features a similar CCl_4 deficit which is transferred to the new antarctic bottom waters upon formation, accounting for the observed deep CCl_4 deficit. (Auth. mod.)

51-617

Ocean circulation variations associated with the Antarctic Circumpolar Wave.

Jacobs, G.A., Mitchell, J.L., *Geophysical research letters*, Oct. 15, 1996, 23(21), p.2947-2950, 12 refs.

Oceanography, Ocean currents, Polar atmospheres, Heat transfer, Advection, Atmospheric circulation, Wind factors, Atmospheric boundary layer, Models, Statistical analysis

Altimeter data analysis indicates persistent sea surface height (SSH) anomalies propagating eastward about the antarctic continent. The spatial and temporal characteristics match variations in the atmosphere and sea surface temperature (SST) that are associated with the Antarctic Circumpolar Wave (ACW). During the observation time period, the SSH appears quasiperiodic with a dominant 4 year period and 180° longitude wavelength. Thus, the SSH signature of the ACW appears as two anomalies on opposite sides of the antarctic continent propagating eastward at 10 cm/s. The SSH response to observed wind forcing agrees in terms of amplitude and phase with simple quasigeostrophic dynamics. (Auth. mod.)

51-618

North Pole ice thickness and association with ice motion history 1977-1992.

Shy, T.L., Walsh, J.E., *Geophysical research letters,* Oct. 15, 1996, 23(21), p.2975-2978, 12 refs.

Oceanography, Sea ice distribution, Ice cover thickness, Ice cover effect, Drift, Ice air interface, Wind factors, Drift stations, Underwater acoustics, Seasonal variations, Arctic Ocean, North Pole

51-619

Dormant state of rifting below the Byrd Subglacial Basin, West Antarctica, implied by magnetotelluric (MT) profiling.

Wannamaker, P.E., Stodt, J.A., Olsen, S.L., *Geophysical research letters,* Oct. 15, 1996, 23(21), p.2983-2986, 13 refs.

Geological surveys, Tectonics, Rock properties, Geomagnetism, Magnetic surveys, Magnetic anomalies, Sounding, Models, Subglacial observations, Ice cover effect, Antarctica—Byrd Subglacial Basin

During the 1994-95 austral summer field season, the authors collected 12, high-quality MT soundings over the Byrd Subglacial Basin of central West Antarctica. Ten equispaced sites in a 54 km profile cross regional aeromagnetic trends and complement seismic reflection and refraction results collected by others. Objectives were to prove such measurements were feasible over the 2 km thick interior ice sheet, and to show from deep electrical resistivity whether the Byrd Basin comprises an active rift environment. The difficult acquisition of electric field data on ice was overcome using a custom electrometer system, with preamplifiers located at the electrode sites to buffer the high contact impedances of the ice as close to the source as possible. Two-dimensional modeling of the profile shows that resistivity of the deep crust and upper mantle is about 2000-3000 ohm-m to 100 km depth or more. This is much higher than observed in active extensional regimes, suggesting that the current state of rifting, at least in this part of central West Antarctica, is dormant. (Auth. mod.)

51-620

Late Quaternary variations in relative sea level due to glacial cycle polar wander.

Bills, B.G., James, T.S., *Geophysical research letters,* Oct. 15, 1996, 23(21), p.3023-3026, 27 refs.

Oceanography, Pleistocene, Earth crust, Glacial geology, Sea level, Glacier oscillation, Ice sheets, Ice melting, Ice loads, Ice cover effect, Isostasy, Viscoelasticity, Analysis (mathematics)

51-621

Analysis of mesoscale linear features observed in the arctic atmospheric boundary layer.

Mourad, P.D., Walter, B.A., *Monthly weather review,* Sep. 1996, 124(9), p.1924-1940, 33 refs.

Climatology, Polar atmospheres, Infrared reconnaissance, Atmospheric boundary layer, Turbulent diffusion, Synoptic meteorology, Atmospheric circulation, Ice air interface, Ice openings, Condensation nuclei, Convection, Ice cover effect, Statistical analysis, Arctic Ocean

51-622

Wintertime surface winds over the Greenland ice sheet.

Bromwich, D.H., Du, Y., Hines, K.M., *Monthly weather review,* Sep. 1996, 124(9), p.1941-1947, 22 refs.

Climatology, Wind (meteorology), Ice sheets, Turbulent boundary layer, Atmospheric circulation, Wind direction, Ice air interface, Ice cover effect, Radiant cooling, Simulation, Mathematical models, Topographic effects, Greenland

51-623

Evolution of the tropospheric split jet over the South Pacific Ocean during the 1986-89 ENSO cycle.

Chen, B., Smith, S.R., Bromwich, D.H., *Monthly weather review,* Aug. 1996, 124(8), p.1711-1731, 55 refs.

Climatology, Marine atmospheres, Atmospheric circulation, Atmospheric pressure, Synoptic meteorology, Polar atmospheres, Seasonal variations, Topographic effects

A case study investigation into the meridional and horizontal circulation over the South Pacific Ocean, including Antarctica, is presented for the 1986-89 El Niño-Southern Oscillation (ENSO) cycle. Analysis of the momentum budget reveals how the split jet in the upper troposphere over South Pacific Ocean evolved during the 1986-89 ENSO cycle. The variations in the split jet may reflect the poleward propagation of the ENSO signal via the South Pacific convergence zone. The implications for the high southern latitudes are discussed as interannual variations are found in the low-level easterlies near Antarctica and the Amundsen Sea low. (Auth. mod.)

51-624

Validation of NOAA-9 SBUV/2 total ozone measurements during the 1994 antarctic ozone hole.

Lienesch, J.H., et al, *Geophysical research letters,* Sep. 15, 1996, 23(19), p.2593-2596, 13 refs.

Climatology, Polar atmospheres, Atmospheric density, Stratosphere, Degradation, Ozone, Ultraviolet radiation, Backscattering, Remote sensing, Spacecraft, Seasonal variations

The Solar Backscatter Ultraviolet (SBUV/2) instrument on the NOAA-9 spacecraft made total ozone measurements over Antarctica during the 1994 Austral Spring depletion. To validate the NOAA-9 ozone measurements, daily zonal ozone averages from NOAA-9 and NOAA-11 measurements in the Northern Hemisphere have been compared. Comparisons have also been made with ground-based measurements from five Dobson stations dispersed on the antarctic continent. The results show that the NOAA-9 data agree to within 1-2% with the Dobson stations. This agreement makes possible not only a continuation of the antarctic measurements without a large instrument-related bias, but also establishes the NOAA-9 data as a suitable transition data set during the replacement of NOAA-11 by NOAA-14. (Auth. mod.)

51-625

Autocatalytic release of bromine from arctic snow pack during polar sunrise.

Tang, T., McConnell, J.C., *Geophysical research letters,* Sep. 15, 1996, 23(19), p.2633-2636, 18 refs.

Climatology, Polar atmospheres, Atmospheric boundary layer, Degradation, Ozone, Aerosols, Scavenging, Organic nuclei, Snow impurities, Snow cover effect, Snow air interface, Vapor diffusion, Photochemical reactions, Models

51-626

Ice core record of fatty acids over the past 450 years in Greenland.

Kawamura, K., Suzuki, I., Fujii, Y., Watanabe, O., *Geophysical research letters,* Sep. 15, 1996, 23(19), p.2665-2668, 35 refs.

Climatology, Climatic changes, Atmospheric circulation, Sedimentation, Ice sheets, Ice air interface, Ice cores, Sampling, Aerosols, Organic nuclei, Statistical analysis, Greenland

51-627

Correction to "Composition and freezing of aqueous H_2SO_4/HNO_3 solutions under polar stratospheric conditions" by K.D. Beyer, S.W. Seago, H.Y. Chang and M.J. Molina.

Beyer, K.D., Seago, S.W., Chang, H.Y., Molina, M.J., *Geophysical research letters,* Sep. 15, 1996, 23(19), p.2715, 1 ref. For pertinent paper see 49-5904 or 231-53285.

Polar atmospheres, Polar stratospheric clouds, Heterogeneous nucleation, Ice vapor interface, Aerosols, Vapor pressure, Cloud physics

In the paper "Composition and Freezing of aqueous H_2SO_4/HNO_3 solutions under polar stratospheric conditions" by K.D. Beyer et al. *(Geophysical Research Letters,* 21(10), 871-874, 1994) the text should be amended to the section "Parameterization of the vapor pressure data," as indicated. (Auth. mod.)

51-628

ARC: a source of multisensor satellite data for polar science.

Van Woert, M.L., Whritner, R.H., Waliser, D.E., Bromwich, D.H., Comiso, J.C., *EOS,* Feb. 11, 1992, 73(6), p.65 and 75-76, 14 refs.

Global change, Remote sensing, Meteorological data, Mapping, Imaging, Sea ice distribution, Spaceborne photography, Antarctica—Weddell Sea, Antarctica—Ronne Ice Shelf, Antarctica—Filchner Ice Shelf

Under the auspices of the National Science Foundation, the Antarctic Research Center (ARC) was established at Scripps Institution of Oceanography to provide real-time, polar-orbiting satellite data in support of antarctic field studies and to maintain a multisensor satellite data archive for retrospective data analysis. This article describes the ARC and its data collection program and data archive and gives one example of how the complementary nature of a multisensor satellite data set can be used to enhance the understanding of physical processes in Antarctica.

51-629

Arctic regions surface air temperature anomalies. *Climate monitor,* Dec. 1989-Dec. 1990, 19(1-5), p.58-65.

Polar atmospheres, Climatology, Air temperature, Surface temperature, Meteorological data, Seasonal variations, Temperature variations

51-630

Listing of temperatures at Arctic and Antarctic stations. *Climate monitor,* Dec. 1989-Dec. 1990, 19(1-5), p.74-83.

Polar atmospheres, Climatology, Air temperature, Seasonal variations, Meteorological data

Tables showing arctic and antarctic stations and their coordinates, and temperatures recorded at the stations from Dec. 1989 through Nov. 1990, as well as mean temperature values for the same period, are presented.

51-631

Survey methods for Quaternary glacial geology. [Disiji bingchuan dizhi diaocha fangfa]

Bai, M.H., ed, Beijing, Dizhi chubanshe (Geological Publishing House), 1983, 270p., In Chinese. 42 refs.

DLC QE576.P25 1983 Orien China

Geological surveys, Glaciation, Glacial geology, Glacial deposits, Glacial erosion, Moraines, Periglacial processes, Quaternary deposits, Geomorphology, Geochronology, Paleoclimatology, China

51-632

Glaciers and climate in the Mount Tuomuer region of the Tian Shan. [Tianshan Tuomuer feng diqu de bingchuan yu qixiang], Urumqi, China, Xinjiang renmin chubanshe (Xinjiang People's Publishing House), 1985, 224p., In Chinese with English table of contents. Refs. passim. Edited by the Scientific Mountaineering Expedition of the Chinese Academy of Sciences (Zhongguo kexue yuan Dengshan kexue kaochadui).

DLC QE576.T54 1985 Orien China

Mountain glaciers, Glacier surveys, Glacier oscillation, Glacial hydrology, Glacier ablation, Meltwater, Glacier heat balance, Glacial meteorology, China—Tian Shan

51-633

Glaciers of Xizang (Tibet). [Xizang bingchuan], Zhongguo kexueyuan Qingzang gaoyuan zonghe kexue kaochadui. Qingzang gaoyuan kexue kaocha congshu (Chinese Academy of Sciences. Qinghai-Xizang Plateau Comprehensive Scientific Survey Team. Series of the Scientific Expedition to the Qinghai-Xizang Plateau), Beijing, Kexue chubanshe (Science Press), 1986, 328p. + plates, In Chinese with English table of contents. Refs. passim.

DLC QE576.H76 1986 Orien China

Mountain glaciers, Glacier surveys, Glacier oscillation, Glacial meteorology, Glacial hydrology, Glacial geology, Alpine glaciation, Snow line, Paleoclimatology, China—Xizang

51-634

Characteristics of different strata of the central Antarctic glacier in connection with microbiological studies. [Kharakteristika razlichnykh sloev lednika tsentral'noĭ Antarktidy v sviazi s mikrobiologicheskimi issledovaniami]

Abyzov, S.S., Lipenkov, V.IA., Bobin, N.E., Kudriashov, B.B., Pashkevich, V.M., *Antarktika,* 1993, No.32, p.188-194, In Russian with English summary. 31 refs.

Ice cores, Ice density, Microbiology, Antarctica—Vostok Station

The results of microbiological studies of ice cores removed from the deep strata of the central antarctic glacier are presented. These show that the number of viable micro-organisms in a state of anabiosis is extremely low in strata more than 150 thousand years old. Special glaciological studies on the cores show an extreme solidity of the glacial monolith in the deep strata preventing the penetration of alien microparticles or drilling fluid. (Auth.)

51-635

Meridional volume and heat transport by large-scale geostrophic currents in the Pacific sector of the Antarctic.

Koshliakov, M.N., Sazhina, T.G., *Oceanology,* June 1996, 35(6), p.767-777, Translated from Okeanologiia. 12 refs.

Oceanography, Ocean currents, Velocity measurement, Hydrography, Heat flux, Air water interactions, Icebergs, Drift, Oceanographic surveys, — South Pacific Ocean

Hydrophysical and current data measurements by an acoustic doppler current meter were obtained in 1992, along 67°S in the Pacific Sector of the Antarctic, and were analyzed for the purpose of estimating the meridional volume and heat transports connected with large-scale geostrophic currents. Large-scale components of all initial hydrophysical fields were obtained by optimal smoothing of these fields along the section. The obtained pattern of geostrophic currents, involves boundary currents at the antarctic continental slope, the volume transports of which were also estimated. The heat transport connected with the barotropic component of this pattern is not representative climatically, because of the instability of this component. The baroclinic mode of the distribution of geostrophic currents includes a vertical component of water circulation, averaged over the section, with currents toward the antarctic continent in the upper part of the ocean and in the opposite direction in the lower part. This mode of currents provides integral heat transport toward the antarctic continent that can be treated as a possible mechanism for the compensation of the annual heat flux from the ocean to the atmosphere in this region. (Auth. mod.)

51-636

Convective mass transport in the underice layer of winter fractures in the arctic basin.

Golovin, P.N., *Oceanology,* June 1996, 35(6), p.778-786, Translated from Okeanologiia. 10 refs.

Oceanography, Ocean currents, Ice water interface, Sea ice, Ice edge, Young ice, Fracture zones, Drift, Subglacial observations, Convection, Salinity, Mass transfer, Hydrodynamics, Ice cover effect, Profiles, Arctic Ocean

51-637

Physical properties of late quaternary sediments of the Kara Shelf and conditions of their formation.

Dunaev, N.N., Levitan, M.A., Kuptsov, V.M., *Oceanology,* June 1996, 35(6), p.833-839, Translated from Okeanologiia. 3 refs.

Oceanography, Pleistocene, Bottom sediment, Profiles, Sediment transport, Turbulent diffusion, Quaternary deposits, Physical properties, Sampling, Russia—Kara Sea

51-638

Comparison of various zooplankton sampling tools based on catches in the Bering Sea.

Musaeva, E.I., Nezlin, N.P., *Oceanology,* June 1996, 35(6), p.857-861, Translated from Okeanologiia. 10 refs.

Oceanography, Marine biology, Biomass, Plankton, Sampling, Samplers, Performance, Statistical analysis, Bering Sea

51-639

Deep electrical conductivity in the Siberian Platform.

Shilovskiĭ, A.P., *Izvestiia. Physics of the solid earth,* Jan. 1995, 30(6), p.576-583, Translated from Fizika zemli. 19 refs.

Geoelectricity, Subpolar regions, Electrical resistivity, Sediments, Earth crust, Porosity, Permeability, Sounding, Profiles, Statistical analysis, Russia—Siberia

51-640

Geoelectromagnetic monitoring of water discharge in the Bering Strait (appraising of potentialities).

Shneĭer, V.S., Trofimov, I.L., Korotaev, S.M., *Izvestiia. Physics of the solid earth,* Jan. 1995, 30(6), p.584-586, Translated from Fizika zemli. 17 refs.

Oceanographic surveys, Magnetic surveys, Geomagnetism, Geoelectricity, Ocean currents, Subpolar regions, Water flow, Water transport, Velocity measurement, Dielectric properties, Models, Bering Strait

51-641

Quaternary pollen records from the Archipiélago de Chiloé in the context of glaciation and climate.

Heusser, C.J., Denton, G.H., Hauser, A., Andersen, B.G., Lowell, T.V., *Revista geológica de Chile,* July 1995, 22(1), p.25-46, With Spanish summary. 56 refs.

Pleistocene, Paleoclimatology, Paleoecology, Glacial geology, Glacial deposits, Quaternary deposits, Palynology, Stratigraphy, Glaciation, Glacier oscillation, Geochronology, Radioactive age determination, Correlation, Chile—Archipiélago de Chiloé

51-642

Cold-fog test.

Chisholm, W.A., et al, *IEEE transactions on power delivery,* Oct. 1996, 11(4), p.1874-1880, 21 refs.

Transmission lines, Electric power, Electrical insulation, Protective coatings, Fog, Icing, Ice melting, Degradation, Charge transfer, Electrical resistivity, Ice solid interface, Ice cover effect, Temperature effects, Cold weather tests

51-643

Freshening of the underice layer due to melting.

Golovin, P.N., Kochetov, S.V., Timokhov, L.A., *Oceanology,* July-Aug. 1995, 35(4), p.482-487, Translated from Okeanologiia. 9 refs.

Oceanography, Sea ice, Pack ice, Ice melting, Ice volume, Ice water interface, Ice bottom surface, Ice deterioration, Diffusion, Water flow, Mathematical models

51-644

Changes in foraminifera fauna and the late Pleistocene paleohydrology in the Indian Ocean (Site 216, Deep Sea Drilling Project).

Beliaeva, N.V., Burmistrova, I.I., *Oceanology,* July-Aug. 1995, 35(4), p.559-564, Translated from Okeanologiia. 36 refs.

Pleistocene, Oceanography, Paleoecology, Bottom sediment, Plankton, Biomass, Sampling, Drill core analysis, Stratigraphy, Statistical analysis, Climatic changes, Indian Ocean

51-645

Peculiarities of the distribution of surface sediments of the Barents Sea eastern part.

Pavlidis, M.A., *Oceanology,* July-Aug. 1995, 35(4), p.565-572, Translated from Okeanologiia. 9 refs.

Oceanography, Sedimentation, Lithology, Particle size distribution, Bottom sediment, Sampling, Classifications, Distribution, Barents Sea

51-646

Pleistocene stratigraphy of the northeastern Altai Mountain region.

Derevianko, A.P., Laukhin, S.A., Shun'kov, M.V., *Russian Academy of Sciences. Transactions. Earth science sections,* Oct. 1995, 334(1), p.51-56, Translated from Rossiĭskaia akademiia nauk. Doklady. 9 refs.

Pleistocene, Mountain soils, Quaternary deposits, Sedimentation, Alluvium, Stratigraphy, Geochronology, Russia—Altay Mountains

51-647

Primary plankton production and distribution in the Lena River estuary and adjoining parts of the Laptev Sea.

Sorokin, IU.I., Sorokin, P.IU., Protkova, IU.V, *Russian Academy of Sciences. Transactions. Earth science sections,* Oct. 1995, 334(1), p.139-144, 13 refs. For Russian original see 49-1377.

Oceanography, Marine biology, Plankton, Biomass, Distribution, Estuaries, Sampling, Classifications, Russia—Laptev Sea, Russia—Lena River

51-648

Vapor optical properties and ablation of large chondrite and ice bodies in the Earth's atmosphere.

Kosarev, I.B., Loseva, T.V., Nemchinov, I.V., *Solar system research,* July-Aug. 1996, 30(4), p.265-278, Translated from Astronomicheskiĭ vestnik. 53 refs.

Atmospheric physics, Extraterrestrial ice, Ablation, Ionization, Thermal radiation, Optical properties, Vapor diffusion, Optical properties, Heat transfer coefficient

51-649

Penetration of biologically active UV radiation and its effect on major biological processes in the Bering and Chukchi Seas.

Izrael, IU.A., Tsiban, A.V., Kudriavtsev, V.M., Shchuka, S.A., Zhukova, A.I., *Russian meteorology and hydrology,* 1995, No.10, p.8-20, Translated from Meteorologiia i gidrologiia. 58 refs.

Marine biology, Ecosystems, Microbiology, Biomass, Photometry, Ultraviolet radiation, Environmental impact, Ecosystems, Seasonal variations, Climatic changes, Bering Sea, Chukchi Sea

51-650

Charge generation in nimbostratus and cumulonimbus.

Kochin, A.V., *Russian meteorology and hydrology,* 1995, No.10, p.26-31, Translated from Meteorologiia i gidrologiia. 7 refs.

Cloud physics, Precipitation (meteorology), Cloud electrification, Charge transfer, Ice water interface, Ice crystals, Snow pellets, Ice melting, Cloud droplets, Mathematical models, Polarization (charge separation)

51-651

Interpycnocline lens dynamics in the Norwegian Sea.

Ivanov, V.V., Korablev, A.A., *Russian meteorology and hydrology,* 1995, No.10, p.32-37, Translated from Meteorologiia i gidrologiia. 10 refs.

Oceanography, Ocean currents, Stratification, Boundary layer, Convection, Analysis (mathematics), Norwegian Sea

51-652

Variability of internal stresses in typical local ice cover inhomogeneities.

Sukhorukov, K.K., *Russian meteorology and hydrology,* 1995, No.10, p.38-48, Translated from Meteorologiia i gidrologiia. 13 refs.

Sea ice, Ice cover thickness, Ice mechanics, Ice deformation, Stress concentration, Shear stress, Thermal stresses, Thermal regime, Temperature gradients

Field measurements performed under various conditions in both the Arctic and Antarctic were used to determine the structure of internal normal stresses in typical local ice cover inhomogeneities: crack boundaries, topographic inhomogeneities, violations of isostatic balance, and temperature differences. (Auth. mod.)

51-653

Phenology of aquatic macroinvertebrates in an alpine wetland.

Mihuc, T.B., Toetz, D.W., *Hydrobiologia,* Sep. 9, 1996, 330(2), p.131-136, 25 refs.

Wetlands, Ecosystems, Ecology, Alpine landscapes, Biomass, Phenology, Climatic factors, Temperature effects, Sampling

51-654

Historical record of ammonium concentrations from a glacier in the Alps.

Döscher, A., Gäggeler, H.W., Schotterer, U., Schwikowski, M., *Geophysical research letters,* Oct. 1, 1996, 23(20), p.2741-2744, 26 refs.

Precipitation (meteorology), Climatology, Snow composition, Mountain glaciers, Aerosols, Organic nuclei, Sedimentation, Ice air interface, Glacier ice, Ice cores, Stratigraphy, Seasonal variations, Geochemistry, Switzerland—Alps

51-655

UV absorption spectra of H_2O/HNO_3 films.

Berland, B.S., Foster, K.L., Tolbert, M.A., George, S.M., *Geophysical research letters,* Oct. 1, 1996, 23(20), p.2757-2760, 22 refs.

Climatology, Polar atmospheres, Cloud physics, Polar stratospheric clouds, Aerosols, Water films, Ice vapor interface, Ultraviolet radiation, Radiation absorption, Photochemical reactions, Spectra, Simulation

The ultraviolet (UV) absorption spectra were measured for amorphous and crystalline H_2O/HNO_3 films representative of polar stratospheric clouds. Film compositions were determined using laser induced thermal desorption. Pure HNO_3 films showed a broad absorption peak with a maximum absorbance at $\lambda \approx 195$ nm. The absorbances of amorphous H_2O/HNO_3 films were also broad and peaked at $\lambda = 196-198$ nm. The absorption cross sections increased slightly for more dilute films, although the band shape was nearly

independent of the H_2O content. The major absorbing species in crystalline hydrates is also NO_3^- and these films all had very similar UV absorption spectra. (Auth. mod.)

51-656

Relation between the northern polar cap and auroral electrojet geomagnetic indices in the wintertime.

Vassiliadis, D., Angelopoulos, V., Baker, D.N., Klimas, A.J., *Geophysical research letters,* Oct. 1, 1996, 23(20), p.2781-2784, 12 refs.

Atmospheric physics, Polar atmospheres, Atmospheric electricity, Geomagnetism, Electric fields, Indexes (ratios), Seasonal variations, Statistical analysis

51-657

Seasonal occurrence of thin metallic ion layers at high latitudes.

Bedey, D.F., Watkins, B.J., *Geophysical research letters,* Oct. 1, 1996, 23(20), p.2789-2792, 13 refs.

Atmospheric physics, Polar atmospheres, Atmospheric electricity, Electric fields, Layers, Ionization, Metals, Radar echoes, Seasonal variations

51-658

Reproductive biology of two arctic species of meadow grass.

Sarapul'tsev, I.E., *Russian journal of ecology,* Sep.-Oct. 1996, 27(5), p.330-333, 13 refs.

Plant ecology, Grasses, Biomass, Sampling, Classifications, Subpolar regions, Floodplains, Vegetation patterns

51-659

Theories of mushy zones: application to alloy solidification, magma transport, frost heave and igneous intrusions.

Fowler, A.C., NATO Advanced Research Workshop, Tahoe, CA, May 12-16, 1986. Proceedings. Structure and dynamics of partially solidified systems. Edited by D.E. Loper and NATO Advanced Science Institutes, Series E. Applied Sciences. Vol.125, Dordrecht, Martinus Nijhoff Publishers, 1987, p.159-199, 115 refs.

DLC QD503.N38

Theories, Frozen ground mechanics, Phase transformations, Solidification, Frost heave, Soil pressure, Freezing front, Ice lenses, Ice crystal growth, Ice water interface, Fluid dynamics, Mathematical models, Soil water migration

51-660

Morphology, microstructure and micromechanics of ice fields.

Ostoja-Starzewski, M., NATO Advanced Research Workshop, Tahoe, CA, May 12-16, 1986. Proceedings. Structure and dynamics of partially solidified systems. Edited by D.E. Loper and NATO Advanced Science Institutes, Series E. Applied Sciences. Vol.125, Dordrecht, Martinus Nijhoff Publishers, 1987, p.437-451, 11 refs.

DLC QD503.N38

Sea ice, Ice mechanics, Ice floes, Ice microstructure, Ice solid interface, Surface structure, Physical properties, Statistical analysis, Ice models, Viscoelasticity, Plastic deformation, Mathematical models, Fractals

51-661

Slush on lakes.

Knight, C.A., NATO Advanced Research Workshop, Tahoe, CA, May 12-16, 1986. Proceedings. Structure and dynamics of partially solidified systems. Edited by D.E. Loper and NATO Advanced Science Institutes, Series E. Applied Sciences. Vol.125, Dordrecht, Martinus Nijhoff Publishers, 1987, p.453-465, 15 refs.

DLC QD503.N38

Lake ice, Slush, Ice water interface, Ice formation, Ice melting, Surface drainage, Snow cover effect, Liquid phases, Phase transformations, Buoyancy, Capillarity

51-662

Ice.

Gemperline, G., Guideline for design of intakes for hydroelectric plants, New York, American Society of Civil Engineers, 1995, p.284-312, Refs. p.308-312.

DLC TK1085.G85

Electric power, Reservoirs, Dams, Water intakes, Cold weather performance, Channels (waterways), Lake ice, Ice cover effect, Frazil ice, Ice control, Ice removal, Ice breaking, Design criteria

51-663

Low temperature induced biochemical mechanisms: implications for cold acclimation and deacclimation.

Stushnoff, C., Remmele, R.L., Jr., Essensee, V., McNeil, M., NATO Advance Research Workshop on Interacting Stresses on Plants in a Changing Climate, London, UK, Sep.13-19, 1992. Proceedings. Edited by M.B. Jackson et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.16, Berlin, Springer-Verlag, 1993, p.647-657, 13 refs.

DLC QK754.5.I56

Plant physiology, Acclimatization, Cryobiology, Cold stress, Frost resistance, Plant tissues, Polymers, Freezing, Protection, Chemical properties, Temperature effects, Cold weather tests, Simulation, Seasonal variations

51-664

Molecular mechanisms of freeze-thaw injury and cold acclimation in herbaceous plants: merging physiological and genetic approaches.

Palta, J.P., Weiss, L.S., Harbage, J.F., Bamberg, J.B., Stone, J.M., NATO Advance Research Workshop on Interacting Stresses on Plants in a Changing Climate, London, UK, Sep.13-19, 1992. Proceedings. Edited by M.B. Jackson et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.16, Berlin, Springer-Verlag, 1993, p.659-680, Refs p.677-680.

DLC QK754.5.I56

Plant physiology, Plant tissues, Cryobiology, Frost resistance, Freeze thaw cycles, Damage, Acclimatization, Ice formation, Heterogeneous nucleation, Freezing rate, Simulation, Temperature effects

51-665

Molecular biology of cold tolerance.

Pearce, R.S., Dunn, M.A., Hughes, M.A., NATO Advance Research Workshop on Interacting Stresses on Plants in a Changing Climate, London, UK, Sep.13-19, 1992. Proceedings. Edited by M.B. Jackson et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.16, Berlin, Springer-Verlag, 1993, p.681-695, Refs. p.693-695.

DLC QK754.5.I56

Plant physiology, Cold tolerance, Acclimatization, Frost resistance, Plant tissues, Grasses, Simulation, Temperature effects, Classifications

51-666

Redesigning crops for increased tolerance to freezing stress.

Steponkus, P.L., Uemura, M., Webb, M.S., NATO Advance Research Workshop on Interacting Stresses on Plants in a Changing Climate, London, UK, Sep.13-19, 1992. Proceedings. Edited by M.B. Jackson et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.16, Berlin, Springer-Verlag, 1993, p.697-714, Refs. p.711-714.

DLC QK754.5.I56

Plant physiology, Agriculture, Grasses, Plant tissues, Chemical composition, Cold stress, Frost resistance, Acclimatization, Simulation, Cryobiology

51-667

Molecular mechanism of the low-temperature tolerance of plants studied by gene technology of membrane lipids.

Murata, N., Wada, H., Gombos, Z., Nishida, I., NATO Advance Research Workshop on Interacting Stresses on Plants in a Changing Climate, London, UK, Sep.13-19, 1992. Proceedings. Edited by M.B. Jackson et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.16, Berlin, Springer-Verlag, 1993, p.715-723, 12 refs.

DLC QK754.5.I56

Plant physiology, Plant tissues, Saturation, Chemical composition, Acclimatization, Cold tolerance, Temperature effects, Polymers, Simulation

51-668

Aspects of the cellular and molecular basis of cold tolerance in plants.

Boudet, A.M., Cabané, M., Leborgne, N., Teulières, C., NATO Advance Research Workshop on Interacting Stresses on Plants in a Changing Climate, London, UK, Sep.13-19, 1992. Proceedings. Edited by M.B. Jackson et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.16, Berlin, Springer-Verlag, 1993, p.725-739, 35 refs.

DLC QK754.5.I56

Plant physiology, Cold tolerance, Frost resistance, Plant tissues, Chemical composition, Simulation, Temperature effects

51-669

Comparison of 6.7-μm radiances computed from aircraft soundings and observed from GOES.

Salathé, E.P., Jr., Smith, R.B., *Journal of geophysical research,* Sep. 27, 1996, 101(D16), p.21,303-21,310, 26 refs.

Climatology, Atmospheric composition, Humidity, Cloud physics, Radiation balance, Radiance, Radiation absorption, Sounding, Radiometry, Brightness, Light scattering, Air temperature, Freezing points, Correlation

51-670

Three-dimensional observations of ice crystal characteristics in polar ice sheets.

Nishida, K., Narita, H., *Journal of geophysical research,* Sep. 27, 1996, 101(D16), p.21,311-21,317, 11 refs.

Glaciology, Ice sheets, Ice cores, Sampling, Ice microstructure, Thin sections, Ice crystal size, Ice crystal structure, Stereomapping, Profiles, Statistical analysis, Antarctica—Mizuho Station

In ice core studies, mean crystal size is generally measured on a section image of an ice specimen. However, an ice crystal with a complex shape may appear as several cells on a section image; consequently, the mean crystal size may be underestimated by overcounting the crystals on the image. The authors examined this phenomenon, called the duplication effect, through three-dimensional observation of crystal shapes. The frequency in which duplicate cells appear on a section image is linear with respect to the frequency of which randomly drawn lines on the image pass a cell more than once. On the basis of this empirical relationship, the error on the mean crystal size caused by the duplication effect can be revised from the section image itself. They also examined crystal sizes in some antarctic ice specimens. The extent of change of crystal size steadily increased with depth up to 100 m and then fluctuated between 6 and 10% in the deeper parts. (Auth. mod.)

51-671

On the formation and persistence of subvisible cirrus clouds near the tropical tropopause.

Jensen, E.J., Toon, O.B., Selkirk, H.B., Spinhirne, J.D., Schoeberl, M.R., *Journal of geophysical research,* Sep. 27, 1996, 101(D16), p.21,361-21,375, 31 refs.

Climatology, Cloud cover, Cloud physics, Homogeneous nucleation, Ice crystal growth, Cloud dissipation, Desiccation, Lidar, Ice crystal optics, Backscattering, Laminar flow, Simulation

51-672
Richardson Mountains, Yukon-Northwest Territories: the northern portal of the postulated 'ice-free corridor'.
Catto, N.R., *Quaternary international,* Mar. 1996, Vol.32, p.3-19, 61 refs.
Pleistocene, Quaternary deposits, Sedimentation, Geomorphology, Glaciation, Glacier oscillation, Ice edge, Glacial geology, Stratigraphy, Geochronology, Canada—Yukon Territory—Richardson Mountains, Canada—Northwest Territories—Richardson Mountains

51-673
Laurentide, Cordilleran, and Montane glaciation in the Western Peach River-Grand Prairie region, Alberta and British Columbia, Canada.
Catto, N.R., Liverman, D.G.E., Bobrowsky, P.T., Rutter, N., *Quaternary international,* Mar. 1996, Vol.32, p.21-32, 67 refs.
Pleistocene, Glaciation, Glacial geology, Quaternary deposits, Glacial deposits, Sedimentation, Glacier oscillation, Coalescence, Stratigraphy, Radioactive age determination, Geochronology, Canada—British Columbia, Canada—Alberta

51-674
Glaciation of the Cypress Hills of Alberta and Saskatchewan and its regional implications.
Kulig, J.J., *Quaternary international,* Mar. 1996, Vol.32, p.53-77, 58 refs.
Pleistocene, Glaciation, Glacial geology, Quaternary deposits, Glacier oscillation, Geochronology, Ice edge, Geomorphology, Glacial deposits, Stratigraphy, Correlation, Canada—Alberta, Canada—Saskatchewan

51-675
Late Wisconsinan deglaciation of Alberta: processes and paleogeography.
Mandryk, C.A.S., *Quaternary international,* Mar. 1996, Vol.32, p.79-85, 58 refs.
Pleistocene, Glacial geology, Geomorphology, Glaciation, Glacier oscillation, Ice edge, Quaternary deposits, Karst, Landscape development, Moraines, Ground ice, Geochronology, Canada—Alberta

51-676
Holocene closing of the 'ice-free' corridor: a biogeographical perspective.
MacDonald, G.M., McLeod, T.K., *Quaternary international,* Mar. 1996, Vol.32, p.87-95, 62 refs.
Pleistocene, Glaciation, Biogeography, Paleoecology, Geomorphology, Vegetation patterns, Lacustrine deposits, Quaternary deposits, Palynology, Geochronology, Radioactive age determination

51-677
Carbonate-containing clays in brick-making mixes: optimisation with respect to frost resistance.
Djuric, M., Ranogajec, J., Marinkovic-Neducin, R., *Canadian ceramics quarterly,* May 1996, 65(2), p.131-138, 14 refs.
Bricks, Ceramics, Clays, Clay minerals, Admixtures, Frost resistance, Physical properties, Microstructure, Freeze thaw tests, Mathematical models, Statistical analysis

51-678
Photo radar from space.
Ramsey, A., *Canadian geographic,* Nov.-Dec. 1995, 115(6), p.27.
Sea ice distribution, Drift, Ice surveys, Ice navigation, Ice reporting, Spaceborne photography, Radar photography

51-679
Northern exposure—traversing Baffin Island's icy reaches.
Dunn, J., *Canadian geographic,* Nov.-Dec. 1995, 115(6), p.70-83.
Arctic landscapes, Expeditions, Traverses, Canada—Northwest Territories—Baffin Island

51-680
^{13}C discrimination by fossil leaves during the late-glacial climate oscillation 12-10 ka BP: measurements and physiological controls.
Beerling, D.J., *Oecologia,* Oct. 1, 1996, 108(1), p.29-37, Refs. p.35-37.
Paleoclimatology, Climatic changes, Paleoecology, Trees (plants), Plant physiology, Vapor transfer, Glacial deposits, Fossils, Radioactive age determination, Isotope analysis, Carbon isotopes, Correlation, Statistical analysis

51-681
Ice fog: the frigid veil of winter.
Phillips, D., *Canadian geographic,* Mar.-Apr. 1996, 116(2), p.18.
Climatology, Weather observations, Ice fog, Supercooled fog, Fog formation, Temperature effects

51-682
Polar opposites.
Salewicz, G., *Canadian geographic,* Mar.-Apr. 1996, 116(2), p.36-41.
Expeditions, Ice sheets, Traverses, Cold weather operation, History, Portable equipment, Navigation, North Pole

51-683
Long-distance pollution soils our Arctic.
Phillips, D., *Canadian geographic,* May-June 1995, 115(3), p.25-26.
Polar atmospheres, Air pollution, Haze, Aerosols, Atmospheric circulation, Origin, Environmental impact

51-684
Unpredictable north magnetic pole.
Darragh, I., *Canadian geographic,* Jan.-Feb. 1994, 115(1), p.9-10.
Geomagnetism, Geophysical surveys, Magnetic surveys, Magma, Orientation, Periodic variations, Polarization (waves), Electromagnetic properties, North Pole

51-685
How frostbite performs its misery.
Phillips, D., *Canadian geographic,* Jan.-Feb. 1994, 115(1), p.20,22.
Frostbite, Physiological effects, Cold weather performance, Clothing, Thermal insulation, Protection, Countermeasures

51-686
As pure as the driven snow.
Shilts, E., *Canadian geographic,* Sep.-Oct. 1995, 115(5), p.21.
Sewage treatment, Spray freezing, Snow manufacturing, Ice crystal structure, Hydraulic jets, Impurities, Cold weather performance

51-687
Getting snow's drift.
Phillips, D., *Canadian geographic,* Jan.-Feb. 1996, 116(1), p.14.
Snow physics, Precipitation (meteorology), Snow crystal growth, Snow crystal structure, Cloud physics, Temperature effects

51-688
Seasonal variations of the antarctic coastal ocean in the vicinity of Lützow-Holm Bay.
Ohshima, K.I., Takizawa, T., Ushio, S., Kawamura, T., *Journal of geophysical research,* Sep. 15, 1996, 101(C9), p.20,617-20,628, 23 refs.
Oceanography, Ocean currents, Turbulent boundary layer, Hydrography, Salinity, Stratification, Profiles, Density (mass/volume), Meltwater, Seasonal variations, Mathematical models, Wind factors, Antarctica—Lützow-Holm Bay
During the period of 1990-1992, year-round oceanographic observations were conducted in the vicinity of Lützow-Holm Bay, East Antarctica. It was found that the thickness of the Winter Water (WW) layer, characterized by a cold fresh oxygen-rich water, exhibits its maximum in the austral fall (typically 500 m) and its minimum in the austral summer (typically 350-400 m). The associated density variation of the water column explains only about one third of the seasonal variations in sea level at the coast, which suggests a large seasonal variation in barotropic coastal flow. Prominent freshening occurs in the WW layer during fall. This appears to be caused by the accumulation of WW, whose upper portion is freshened in the preceding summer. These seasonal variations appear to occur every year. The authors propose that the seasonal variation in the WW layer is caused by the seasonal variation in the wind over the coastal ocean. (Auth. mod.)

51-689
Eddies of newly formed upper Labrador Sea water.
Pickart, R.S., Smethie, W.M., Jr., Lazier, J.R.N., Jones, E.P., Jenkins, W.J., *Journal of geophysical research,* Sep. 15, 1996, 101(C9), p.20,711-20,726, 26 refs.
Oceanography, Hydrography, Ocean currents, Velocity measurement, Sea water, Turbulent diffusion, Convection, Stratification, Air water interactions, Ventilation, Sampling, Labrador Sea

51-690
Atmospheric and oceanic forcing of Weddell Sea ice motion.
Kottmeier, C., Sellmann, L., *Journal of geophysical research,* Sep. 15, 1996, 101(C9), p.20,809-20,824, 23 refs.
Sea ice distribution, Oceanography, Drift, Ocean currents, Velocity measurement, Turbulent boundary layer, Air ice water interaction, Ice cover effect, Wind factors, Antarctica—Weddell Sea
The data from sea ice buoys are uniformly analyzed by objective methods. Geostrophic winds are derived after matching of the buoy pressure data with the surface pressure fields of the European Centre for Medium Range Weather Forecasts. The ratio between ice drift and geostrophic wind speeds is reduced when winds and currents oppose each other, when the atmospheric surface layer is stably stratified, and when the ice is under pressure near coasts. Far from coasts, speed ratios, which presumably reflect internal stress variations in the ice cover, are independent of drift divergence on the spatial scale of 100 km. To study basin-scale ice dynamics, all ice drift data are related to the geostrophic winds based on the complex linear model for daily averaged data. In the southwestern Weddell Sea the mean ice drift speed is reduced to less than 0.5% of the geostrophic wind speed and increases rather continuously to 1.5% in the northern, central, and eastern Weddell Sea. The linear model accounts for less than 50% of the total variance of drift speeds in the southwestern Weddell Sea and up to 80% in the northern and eastern Weddell Sea. (Auth. mod.)

51-691
Ice-coupled wave propagation across an abrupt change in ice rigidity, density, or thickness.
Barrett, M.D., Squire, V.A., *Journal of geophysical research,* Sep. 15, 1996, 101(C9), p.20,825-20,832, 16 refs.
Oceanography, Sea ice, Gravity waves, Wave propagation, Ice water interface, Ice density, Ice cover thickness, Surface structure, Physical properties, Mathematical models, Ice cover effect

51-692
Simple model study of the Arctic Ocean freshwater balance, 1979-1985.
Steele, M., Thomas, D., Rothrock, D., Martin, S., *Journal of geophysical research,* Sep. 15, 1996, 101(C9), p.20,833-20,848, 44 refs.
Oceanography, Ocean currents, Water transport, Water balance, Salinity, Turbulent exchange, Sea ice, Air ice water interaction, Ice cover effect, Seasonal variations, Mathematical models, Ice models, Arctic Ocean

51-693
Assimilating satellite concentration data into an arctic sea ice mass balance model, 1979-1985.
Thomas, D., Martin, S., Rothrock, D., Steele, M., *Journal of geophysical research,* Sep. 15, 1996, 101(C9), p.20,849-20,868, 49 refs.
Oceanography, Ice surveys, Radiometry, Sea ice distribution, Drift, Ice cover thickness, Mass balance, Advection, Ice water interface, Ice models, Mathematical models, Thermodynamics, Seasonal variations, Arctic Ocean

51-694
Sea ice and oxygen isotopes in Foxe Basin, Hudson Bay, and Hudson Strait, Canada.
Tan, F.C., Strain, P.M., *Journal of geophysical research,* Sep. 15, 1996, 101(C9), p.20,869-20,876, 17 refs.
Oceanography, Runoff, Surface waters, Sea ice, Ice melting, Ice water interface, Meltwater, Salinity, Turbulent diffusion, Oxygen isotopes, Isotope analysis, Sampling, Canada—Northwest Territories—Hudson Strait, Canada—Hudson Bay

51-695

Multibasin reduced model of the global thermohaline circulation: paleoceanographic analyses of the origins of ice-age climate variability.

Sakai, K., Peltier, W.R., *Journal of geophysical research,* Oct. 15, 1996, 101(C10), p.22,535-22,562, 44 refs.

Oceanography, Paleoclimatology, Climatic changes, Hydrologic cycle, Ocean currents, Salinity, Heat flux, Glacier melting, Meltwater, Air ice water interaction, Mathematical models

A new, multibasin reduced model of the global thermohaline circulation has been developed that builds upon the single-basin Atlantic model recently described in Sakai and Peltier [1995]. The model comprises individual, two-dimensional, Atlantic, Indian, and Pacific components which are linked via a circumpolar basin representative of the southern ocean. It also includes a complete seasonal cycle for sea surface temperature, a sea ice component, and an acceptably accurate representation of the influence of both wind stress and bottom topography. The circulation in the individual basins is described using a stretched coordinate system in order to allow the use of reduced vertical resolution where high resolution is unnecessary. The authors also describe a sequence of paleoceanographic experiments that have been designed to explore the sensitivity of the deep circulation to the impact of the specific surface freshwater anomalies that are known to have developed during the last deglaciation event of the current ice age. The simulation of the response of the thermohaline circulation to such anomalies provides strong additional support for the notion that modulation of the strength of the overturning flow in the Atlantic basin played a very important role in the Younger-Dryas climate reversal. (Auth. mod.)

51-696

Partitioning of solar energy in melt ponds from measurements of pond albedo and depth.

Podgornyĭ, I.A., Grenfell, T.C., *Journal of geophysical research,* Oct. 15, 1996, 101(C10), p.22,737-22,748, 27 refs.

Climatology, Radiation balance, Sea ice, Ice surface, Ponds, Ice melting, Meltwater, Refractivity, Solar radiation, Albedo, Radiance, Upwelling, Ice water interface, Air water interactions, Mathematical models

51-697

Ice shelf basal melting at the grounding line, measured from seismic observations.

Smith, A.M., *Journal of geophysical research,* Oct. 15, 1996, 101(C10), p.22,749-22,755, 35 refs.

Ice shelves, Grounded ice, Ice solid interface, Ice bottom surface, Ice melting, Glacier mass balance, Melting points, Seismic surveys, Seismic reflection, Profiles, Antarctica—Rutford Ice Stream

Analysis of seismic data provides a new technique to measure basal melting of an ice shelf close to the grounding line. Internal reflections have been observed within the ice on a seismic reflection profile at the grounding line of Ronne Ice Shelf. The changes in ice thickness above and below these reflections have been used in a steady state model to calculate the basal mass flux of the ice shelf soon after the ice begins to float. Strain rates within the ice, calculated during the modeling, agree with values from nearby survey data. The calculated melt rates range between 0 and 7 m/yr with an estimated standard error of ±2.4 m/yr, in reasonable agreement with earlier estimates based on surface glaciological observations. (Auth. mod.)

51-698

Effect of deglaciation on mantle melting beneath Iceland.

Jull, M., McKenzie, D., *Journal of geophysical research,* Oct. 10, 1996, 101(B10), p.21,815-21,828, 23 refs.

Pleistocene, Tectonics, Earth crust, Magma, Glacial geology, Viscoelasticity, Fluid dynamics, Ice loads, Stress concentration, Ice sheets, Glacier oscillation, Ice melting, Ice cover effect, Ice solid interface, Mathematical models, Iceland

51-699

Effects of temperature on fracture in dry slab avalanche release.

McClung, D.M., *Journal of geophysical research,* Oct. 10, 1996, 101(B10), p.21,907-21,920, 25 refs.

Avalanche mechanics, Avalanche triggering, Snow physics, Snow slides, Snow cover stability, Cracking (fracturing), Crack propagation, Snow temperature, Temperature variations, Temperature effects, Microstructure, Shear stress, Mathematical models

51-700

Full coverage, high-resolution, topographic model of Greenland computed from a variety of digital elevation data.

Ekholm, S., *Journal of geophysical research,* Oct. 10, 1996, 101(B10), p.21,961-21,972, 39 refs.

Ice sheets, Height finding, Ice surveys, Geophysical surveys, Geodetic surveys, Topographic surveys, Photogrammetric surveys, Spaceborne photography, Topographic features, Models, Correlation, Greenland

51-701

Quantifying nonlinearity and geometry in time series of climate.

King, T., *Quaternary science reviews,* Apr. 1996, 15(4), p.247-266, 45 refs.

Paleoclimatology, Climatic changes, Global change, Ice volume, Mathematical models, Statistical analysis, Periodic variations, Spectra

51-702

Chronology of the last termination: a review of radiocarbon-dated, high-resolution terrestrial stratigraphies.

Wohlfarth, B., *Quaternary science reviews,* Apr. 1996, 15(4), p.267-284, Refs. p.280-284.

Paleoclimatology, Climatic changes, Global change, Pleistocene, Sediments, Paleoecology, Palynology, Stratigraphy, Geochronology, Radioactive age determination, Classifications, Correlation

51-703

Climatic control on Quaternary fluvial sedimentation in the Kleszczów Graben, central Poland.

Krzyszkowski, D., *Quaternary science reviews,* Apr. 1996, 15(4), p.315-333, 62 refs.

Pleistocene, Paleoclimatology, Climatic changes, Quaternary deposits, River basins, Sedimentation, Glacial deposits, Stratigraphy, Lithology, Subsidence, Geomorphology, Poland

51-704

Quaternary glacial history of NW Garhwal, central Himalayas.

Sharma, M.C., Owen, L.A., *Quaternary science reviews,* Apr. 1996, 15(4), p.335-365, 65 refs.

Pleistocene, Paleoclimatology, Geomorphology, Mountain glaciers, Glacial geology, Glacier oscillation, Quaternary deposits, Moraines, Landforms, Geochronology, Luminescence, Age determination, India—Himalaya Mountains

51-705

Evidence of Cordilleran Late Wisconsinan glaciers in the 'ice-free corridor'.

Levson, V.M., Rutter, N.W., *Quaternary international,* Mar. 1996, Vol.32, p.33-51, Refs. p.49-51.

Pleistocene, Glacial geology, Geomorphology, Glaciation, Glacier flow, Coalescence, Quaternary deposits, Glacial deposits, Stratigraphy, Geochronology, Radioactive age determination, Canada—Alberta

51-706

Long-term trends in Laurentian Great Lakes ice cover.

Assel, R.A., National Oceanic and Atmospheric Adminstration. Great Lakes Environmental Research Laboratory. Open file report No.939, Ann Arbor, Dec. 1994, 5p., 11 refs.

Climatology, Climatic changes, Global warming, Lake ice, Ice conditions, Long range forecasting, Freezeup, Ice melting, Seasonal freeze thaw, Seasonal variations, Great Lakes

51-707

Conference portfolio.

International Conference for Arctic Research Planning, Hanover, NH, Dec. 5-9, 1995, International Arctic Science Committee, Oslo, National Academy of Sciences, Dec. 1995, var.p., Includes draft copies of specific implementation plans.

Research projects, Meetings, Global change, Climatic changes, Oceanography, Glaciology, Polar atmospheres, Marine biology, Climatology, Ecosystems, Environmental protection, Long range forecasting, International cooperation, Arctic Ocean

51-708

Crustal shear-wave splitting from local earthquakes in the Hengill triple junction, southwest Iceland.

Evans, J.R., Foulger, G.R., Julian, B.R., Miller, A.D., *Geophysical research letters,* Mar. 1, 1996, 23(5), p.455-458, 12 refs.

Subpolar regions, Geological surveys, Seismic surveys, Earth crust, Earthquakes, Tectonics, Wave propagation, Polarization (waves), Shear stress, Statistical analysis, Iceland

51-709

Initial results from the ICEMELT experiment: body-wave delay times and shear-wave splitting across Iceland.

Bjarnason, I.T., Wolfe, C.J., Solomon, S.C., Gudmundson, G., *Geophysical research letters,* Mar. 1, 1996, 23(5), p.459-462, 19 refs.

Geological surveys, Seismic surveys, Earth crust, Tectonics, Anisotropy, Shear properties, Wave propagation, Seismic velocity, Statistical analysis, Iceland

51-710

Simulating three-dimensional ground water response in a small mountainous watershed.

Flerchinger, G.N., Shang, S.L., Finnie, J.I., *Water resources bulletin,* Oct. 1996, 32(5), p.1081-1088, 12 refs.

Watersheds, Hydrogeology, Ground water, Hydrologic cycle, Snow hydrology, Snowmelt, Subsurface drainage, Flow measurement, Mathematical models, Snow cover effect

51-711

Observation and simulation of barrier winds at the western margin of the Greenland ice sheet.

Van den Broeke, M.R., Gallée, H., *Royal Meteorological Society. Quarterly journal B,* July 1996, 122(534), p.1365-1383, 34 refs.

Wind (meteorology), Synoptic meteorology, Tundra climate, Turbulent boundary layer, Ice sheets, Snow air interface, Turbulent exchange, Ice edge, Ice melting, Advection, Temperature gradients, Simulation, Greenland

51-712

Analysis of a rigid frame model of porous media for the acoustic properties of dense snow.

Marco, O., Buser, O., Villemain, P., *Journal of sound and vibration,* Oct. 3, 1996, 196(4), p.439-451, 21 refs.

Snow physics, Snow density, Acoustic measurement, Snow acoustics, Sound waves, Oscillations, Wave propagation, Simulation, Porosity, Snow crystal structure, Mathematical models, Snow compaction

51-713

Mineral nitrogen transformations in and under seasonal snow in a high-elevation catchment in the Rocky Mountains, United States.

Williams, M.W., Brooks, P.D., Mosier, A., Tonnessen, K.A., *Water resources research,* Oct. 1996, 32(10), p.3161-3171, 40 refs.

Ecosystems, Alpine landscapes, Watersheds, Snow hydrology, Snowmelt, Snow composition, Subsurface drainage, Geochemical cycles, Snow cover effect, Surface waters, Aerosols, Ion density (concentration), Sampling, Seasonal variations, United States—Colorado—Niwot Ridge

51-714

Climate-controlled glacial erosion in the unconsolidated sediments of northwestern Europe, based on a genetic model for tunnel valley formation.

van Dijke, J.J., Veldkamp, A., *Earth surface processes and landforms,* Apr. 1996, 21(4), p.327-340, 48 refs.

Pleistocene, Glacial hydrology, Subglacial drainage, Glacial geology, Ice push, Glacier beds, Ice solid interface, Ice cover effect, Quaternary deposits, Glacial erosion, Geomorphology, Valleys, Mathematical models

51-715

Dynamics of microplankton communities at the ice-edge zone of the Lazarev Sea during a summer drogue study.

Froneman, P.W., Perissinotto, R., McQuaid, C.D., *Journal of plankton research,* Aug. 1996, 18(8), p.1455-1470, Refs. p.1467-1470.

Marine biology, Ecosystems, Plankton, Sea ice, Ice edge, Ice water interface, Biomass, Nutrient cycle, Geochemical cycles, Chlorophylls, Sampling

Microzooplankton grazing and community structure were investigated in the austral summer of 1995 at the ice-edge zone of the Lazarev Sea. Grazing was estimated at the surface chlorophyll maximum (5-10 m) by employing the sequential dilution technique. Chlorophyll *a* concentrations were dominated by chain-forming microphytoplankton of the genera *Chaetoceros* and *Nitzschia.* Microzooplankton were numerically dominated by aloricate ciliates and dinoflagellates. Instantaneous growth rates of nanophytoplankton varied between 0.019 and 0.080/day. Instantaneous grazing rates of microzooplankton on nanophytoplankton varied from 0.012 to 0.052/day. This corresponds to a nanophytoplankton daily loss of between 1.3 and 7.0% of the initial standing stock, and between 45 and 97% of the daily potential production. Growth rates of microphytoplankton were lower, varying between 0.011 and 0.070/day. At only 3 of the 10 stations did grazing by microzooplankton result in a decrease in microphytoplankton concentration. Data show that microzooplankton grazing at the ice edge were not sufficient to prevent chlorophyll *a* accumulation in regions dominated by microphytoplankton. Here, the major biological routes for the uptake of carbon therefore appear to be grazing by metazoans or the sedimentation of phytoplankton cells. (Auth. mod.)

51-716

Circulation changes in the Faeroe-Shetland Channel correlating with cold events during the last glacial period (58-10 ka).

Rasmussen, T.L., Thomsen, E., Labeyrie, L., van Weering, T.C.E., *Geology,* Oct. 1996, 24(10), p.937-940, 25 refs.

Pleistocene, Paleoclimatology, Climatic changes, Marine deposits, Paleoecology, Ice rafting, Ocean currents, Drill core analysis, Ice cores, Correlation, Isotope analysis, Geochronology, Greenland Sea

51-717

Global sea ice concentration data set for use with the ECMWF Re-analysis system.

Nomura, A., European Centre for Medium-range Weather Forecasts. Technical report. Re-analysis project No.76, Berkshire, Mar. 1995, 25p., 20 refs.

Oceanography, Sea ice distribution, Ice surveys, Sensor mapping, Radiometry, Data processing, Seasonal variations, Statistical analysis

The global sea ice concentration data set used in the European Centre for Medium-Range Weather Forecasts Re-Analysis system is described. This data set consists of weekly global sea ice concentration data from Nov. 1978 to Dec. 1991. The original data used in the calculations were created from satellite multichannel microwave radiometer data. Because many erroneous data were included in the original sea ice concentration data, a quality control process was carried out to remove them. To fix the sea ice limit to be used as a sea ice mask in the numerical prediction model, the sea ice data were compared with manual analyses over the Baltic Sea and the Sea of Okhotsk, and a sea ice concentration of 55% was found for the best criterion. The satellite sea ice data showed some interesting features: the seasonal change characteristic of sea ice coverage is different between the Arctic and the Antarctic. The annual mean sea ice extent was almost constant for the Antarctic but it showed a slight decrease for the Arctic. In spite of small interannual variations of total sea ice extent, large variations were observed in local sea ice coverage. (Auth. mod.)

51-718

Development of the antarctic ozone hole.

Schoeberl, M.R., et al, *Journal of geophysical research,* Sep. 20, 1996, 101(D15), p.20,909-20,924, 55 refs.

Climatology, Air pollution, Polar atmospheres, Stratosphere, Ozone, Atmospheric density, Degradation, Aerosols, Condensation, Seasonal variations, Simulation, Mathematical models

A Lagrangian chemical model is used to simulate the formation of the antarctic "ozone hole": the decrease in high-latitude Southern Hemisphere ozone between mid-Aug. and mid-Sep. of each year. The model benchmark simulation of HNO_3, $ClONO_2$, ClO, and ozone for Sep. 17, 1992, is in good agreement with UARS observations. Simulations of the ozone column over the years 1979-1994 show quantitative agreement with the secular decline in antarctic ozone and change in the area of the ozone hole as observed by the total ozone mapping spectrometer. The model calculates that the antarctic ozone loss and ozone hole area both increased linearly with time after the early 1970s until the early 1990s. After the early 1990s the growth of the area of the ozone hole slows as a result of the slowing of the growth rate of total inorganic chlorine. A hypothetical doubling of the 1992 atmospheric chlorine amount would expand the ozone hole to the very edge of the polar vortex. (Auth. mod.)

51-719

Correlated millimeter wave measurements of ClO, N_2O, and HNO_3 from McMurdo, Antarctica, during polar spring 1994.

Klein, U., Crewell, S., De Zafra, R.L., *Journal of geophysical research,* Sep. 20, 1996, 101(D15), p.20,925-20,932, 24 refs.

Climatology, Polar atmospheres, Stratosphere, Aerosols, Turbulent diffusion, Ozone, Atmospheric density, Sounding, Seasonal variations, Antarctica—McMurdo Station

Ground-based observations of stratospheric ClO, N_2O, and HNO_3 were made at McMurdo Station during the austral spring of 1994, using two separate microwave receivers. In early Sep., McMurdo was located well inside the polar vortex, and high mixing ratios of chlorine monoxide were measured in the lower stratosphere. Because of vortex movement, later measurements were taken in edge regions, where ClO was found to be quite variable. This vortex movement also provided an opportunity to study relative changes between all three species. Almost no HNO_3 was seen below 20 km during the measurement period, indicating that stratospheric air had been efficiently denitrified by polar stratospheric cloud formation. A significant increase of the nitric acid column was observed only around Sep. 20, when McMurdo was closer to the outer edge of the vortex. Subsidence continued in the stratosphere over McMurdo Station until at least early Oct., when measurements were stopped. (Auth. mod.)

51-720

Sources and sinks of carbonyl compounds in the Arctic Ocean boundary layer: polar ice floe experiment.

Shepson, P.B., et al, *Journal of geophysical research,* Sep. 20, 1996, 101(D15), p.21,081-21,089, 24 refs.

Climatology, Polar atmospheres, Marine atmospheres, Atmospheric composition, Aerosols, Hydrocarbons, Turbulent diffusion, Atmospheric boundary layer, Aerosols, Ozone, Sampling, Degradation, Ice air interface, Pack ice, Statistical analysis, Arctic Ocean

51-721

Global satellite observations of negative brightness temperature differences between 11 and 6.7 µm.

Ackerman, S.A., *Journal of the atmospheric sciences,* Oct. 1, 1996, 53(19), p.2803-2812, 24 refs.

Climatology, Polar atmospheres, Radiation balance, Brightness, Temperature variations, Radiometry, Spectra, Cloud cover, Detection, Statistical analysis

Global analyses of satellite spectral observations indicate the existence of negative brightness temperature differences when cold scenes are viewed. In July, more than 60% of the observations over the antarctic plateau had BT_{11}-$BT_{6.7} < -5$ K. In Jan., over Greenland, the frequency of occurrence is approximately 20%. Three factors are investigated that may contribute to these observed negative brightness temperature differences: 1) calibration errors, 2) nonuniform scenes within the field of view, and 3) physical properties of the observed phenomena. A doubling and adding radiative transfer model is used to investigate the physical explanations of the negative differences. The model simulations are capable of producing large negative differences over high-altitude polar regions. Distinguishing clear and cloudy regions from satellite infrared radiances is a challenging problem in polar winter conditions. Brightness temperature differences provide a technique to separate cold, optically thick clouds from clear-sky conditions when strong radiation inversions exist at the surface. Further evidence that the large negative values of BT_{11}-$BT_{6.7}$ are associated with surface inversions is presented by comparing the satellite observations with surface temperature measurements from an antarctic automated weather station. (Auth. mod.)

51-722

Single scattering properties of atmospheric ice crystals.

Macke, A., Mueller, J., Raschke, E., *Journal of the atmospheric sciences,* Oct. 1, 1996, 53(19), p.2813-2825, 44 refs.

Climatology, Cloud physics, Light scattering, Ice crystal optics, Ice crystal structure, Classifications, Statistical analysis, Simulation, Polarization (waves), Fractals

51-723

Frost formation under different gaseous atmospheres.

Fukada, S., Tsuru, H., Nishikawa, M., *Journal of chemical engineering of Japan,* Dec. 1995, 28(6), p.732-737, 15 refs.

Cryogenics, Freezers, Frost, Ice physics, Thermal conductivity, Ice growth, Ice vapor interface, Vapor pressure, Heat flux, Mass transfer, Simulation, Statistical analysis

51-724

Microcomputer-based Alpine Snow-cover Analysis System (ASCAS).

Baumgartner, M.F., Rango, A., *Photogrammetric engineering & remote sensing,* Dec. 1995, 61(12), p.1475-1486, 30 refs.

Climatology, Snow surveys, Alpine landscapes, Remote sensing, Sensor mapping, Spaceborne photography, Snow hydrology, Snow cover distribution, Snowmelt, Runoff forecasting, Computerized simulation, Computer applications

51-725

Estimating iceberg populations on the Grand Banks.

Crocker, G.B., Canadian Ice Workshop, 5th, St. John's, Newfoundland, Canada, Nov. 30-Dec. 2, 1994, 1994, 11p., 8 refs.

Oceanography, Sea ice distribution, Icebergs, Calving, Statistical analysis, Sea clutter, Data processing, Accuracy, Ice detection, Ice navigation, Ice forecasting, Canada—Grand Banks

51-726

Gravimetric investigations in the permafrost of two rock glaciers near Ny-Ålesund, Svalbard.

Vonder Mühll, D., Zürich. Eidgenössischen Technischen Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaciologie. Arbeitsheft No.18, Zürich, Nov. 1995, 26p. + appends., 14 refs.

Geophysical surveys, Topographic surveys, Rock glaciers, Sounding, Gravity anomalies, Subarctic landscapes, Periglacial processes, Permafrost physics, Creep, Topographic effects, Moraines, Norway—Svalbard

51-727

Report by the Arctic Institute of North America on review of arctic research.

Arctic Institute of North America, New York, Oct. 1961, 5p.

Military research, Research projects, Cold weather operation, Cold weather performance

51-728

Freezing as a method of sample preservation for the analysis of dissolved inorganic nutrients in seawater.

Dore, J.E., Houlihan, T., Hebel, D.V., Tien, G., Tupas, L., Karl, D.M., *Marine chemistry,* Aug. 1996, 53(3-4), p.173-185, 37 refs.

Marine biology, Nutrient cycle, Suspended sediments, Solubility, Sampling, Preserving, Cold storage, Sea water freezing, Frozen liquids, Laboratory techniques, Geochemical cycles

51-729

Biogeochemistry of Lena River: organic carbon and nutrients distribution.

Cauwet, G., Sidorov, I., *Marine chemistry,* Aug. 1996, 53(3-4), p.211-227, 23 refs.

Estuaries, Subpolar regions, Oceanography, Water chemistry, Runoff, Surface drainage, Turbulent diffusion, Mass transfer, Geochemical cycles, Organic nuclei, Suspended sediments, Sampling, Russia—Laptev Sea, Russia—Lena River

51-730

Distribution and sinking rates of phytoplankton, detritus, and particulate biogenic silica in the Laptev Sea and Lena River (arctic Siberia).

Heiskanen, A.S., Keck, A., *Marine chemistry,* Aug. 1996, 53(3-4), p.229-245, 33 refs.

Oceanography, Estuaries, Subpolar regions, Marine biology, Ecosystems, Plankton, Biomass, Suspended sediments, Geochemical cycles, Sampling, Hydrography, Nutrient cycle, Seasonal variations, Russia—Laptev Sea, Russia—Lena River

51-731

Microbial activities in the Lena River delta and Laptev Sea.

Saliot, A., Cauwet, G., Cahet, G., Mazaudier, D., Daumas, R., *Marine chemistry,* Aug. 1996, 53(3-4), p.247-254, 20 refs.

Oceanography, Estuaries, Runoff, Subpolar regions, Deltas, Microbiology, Bacteria, Marine biology, Biomass, Sampling, Organic nuclei, Geochemical cycles, Degradation, Russia—Laptev Sea, Russia—Lena River

51-732

Outflow of trace metals into the Laptev Sea by the Lena River.

Guieu, C., Huang, W.W., Martin, J.M., Yong, Y.Y., *Marine chemistry,* Aug. 1996, 53(3-4), p.255-267, 32 refs.

Oceanography, Estuaries, Subpolar regions, Runoff, Water chemistry, Metals, Microanalysis, Suspended sediments, Solubility, Sediment transport, Sampling, Geochemical cycles, Russia—Laptev Sea, Russia—Lena River

51-733

Partitioning of trace metals between the dissolved and particulate phases and particulate surface reactivity in the Lena River estuary and the Laptev Sea (Russia).

Garnier, J.M., Martin, J.M., Mouchel, J.M., Sioud, K., *Marine chemistry,* Aug. 1996, 53(3-4), p.269-283, 40 refs.

Oceanography, Subpolar regions, Estuaries, Runoff, Turbulent diffusion, Metals, Water chemistry, Suspended sediments, Geochemical cycles, Sampling, Particles, Solid phases, Solubility, Russia—Laptev Sea, Russia—Lena River

51-734

Distribution of trace and major elements in sediment and pore waters of the Lena Delta and Laptev Sea.

Nolting, R.F., Van Dalen, M., Helder, W., *Marine chemistry,* Aug. 1996, 53(3-4), p.285-299, 40 refs.

Oceanography, Subpolar regions, Estuaries, Deltas, Bottom sediment, Leaching, Geochemical cycles, Suspended sediments, Sampling, Metals, Profiles, Statistical analysis, Russia—Laptev Sea, Russia—Lena River

51-735

Radiocarbon of Quaternary along shore and bottom deposits of the Lena and the Laptev Sea sediments.

Kuptsov, V.M., Lisitsyn, A.P., *Marine chemistry,* Aug. 1996, 53(3-4), p.301-311, 9 refs.

Oceanography, Subpolar regions, Estuaries, Runoff, Organic soils, Bottom sediment, Drill core analysis, Quaternary deposits, Radioactive age determination, Geochronology, Sampling, Organic nuclei, Russia—Laptev Sea, Russia—Lena River

51-736

Propeller ice load models joint Finnish Canadian project completed.

Koskinen, P., Jussila, M., Soininen, H., *Maritime research news,* 1996, 10(1), p.6-7, 5 refs.

Marine transportation, Ships, Floating ice, Propellers, Deformation, Performance, Design criteria, Standards, Models, Simulation, Ice solid interface, Ice loads, Impact tests

51-737

Adaptation to variation in growing season length in arctic populations of *Saxifraga oppositifolia* L.

Crawford, R.M.M., Chapman, H.M., Smith, L.C., *Botanical journal of Scotland,* 1995, 47(2), p.177-192, 17 refs.

Plant ecology, Grasses, Ecosystems, Phenology, Microclimatology, Climatic factors, Vegetation patterns, Growth, Plant physiology, Seasonal variations, Acclimatization, Cold weather survival

51-738

Genetic and environmental contributions to the winter hardiness of conifers.

Wellburn, A.R., *Botanical journal of Scotland,* 1995, 47(2), p.193-209, Refs. p.204-209.

Trees (plants), Cold tolerance, Acclimatization, Plant physiology, Plant tissues, Frost resistance, Desiccation, Temperature effects

51-739

Soil freezing characteristic: its measurement and similarity to the soil moisture characteristics.

Spaans, E.J.A., Baker, J.M., *Soil Science Society of America. Journal,* Jan.-Feb. 1996, 60(1), p.13-19, 31 refs.

Soil freezing, Water retention, Soil water migration, Frozen ground mechanics, Frozen ground thermodynamics, Ice water interface, Interstitial ice, Soil tests, Probes, Unfrozen water content

51-740

Regional stratigraphic isochron (ca. 8000 ^{14}C yr B.P.) from final deglaciation of Hudson Strait.

Kerwin, M.W., *Quaternary research,* Sep. 1996, 46(2), p.89-98, 38 refs.

Pleistocene, Quaternary deposits, Marine geology, Marine deposits, Glacial geology, Glacial deposits, Drill core analysis, Glacier oscillation, Glacial geology, Radioactive age determination, Geochronology, Stratigraphy, Canada—Hudson Strait

51-741

Vegetation history of Pleasant Island, southeastern Alaska, since 13,000 yr B.P.

Hansen, B.C.S., Engstrom, D.R., *Quaternary research,* Sep. 1996, 46(2), p.161-175, 61 refs.

Paleoecology, Paleoclimatology, Quaternary deposits, Lacustrine deposits, Tundra vegetation, Vegetation patterns, Subarctic landscapes, Palynology, Paludification, Revegetation, Radioactive age determination, Geochronology, United States—Alaska—Pleasant Island

51-742

Singularity-free interpretation of the thermodynamics of supercooled water.

Sastry, S., Debenedetti, P.G., Sciortino, F., Stanley, H.E., *Physical review E,* June 1996, 53(6), p.6144-6154, 33 refs.

Water structure, Supercooling, Liquid cooling, Thermal expansion, Temperature effects, Thermodynamic properties, Hydrogen bonds, Mathematical models, Latticed structures

51-743

Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995).

Oerter, H., ed, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, 128p., Refs. passim. For individual papers see F-56064 through F-56076, F-56078, F-56079, F-56081 through F-56087, G-56080, J-56077 or 51-744 through 51-767.

DLC G890.F55.R47

Research projects, Low temperature research, Sea ice, Ice shelves, Ice sheets, Radio echo soundings, Ice cores, Geodetic surveys, Ice water interface, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

This report contains 24 written summaries of 30 talks presented at the 10th International Workshop of the Filchner-Ronne Ice Shelf Programme (FRISP). The meeting was held at Leipzig, Germany, on June 11-14, 1995. The papers collected in this volume present an overview of FRISP and of the cooperation of participating groups. ERS-1 data, used for the determination of special surface features and ice velocities, are included in the report. The ice-shelf ocean interaction is one of the major topics, including field investigations and modelling, with seismic measurements and airborne radio echo sounding data discussed and illustrated.

51-744

Ice-ocean interactions in front of Filchner-Ronne Ice Shelf.

Bombosch, A., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.11-13, 5 refs.

DLC G890.F55.R47

Ice water interface, Ice formation, Ice models, Ice crystal structure, Ice shelves, Oceanography, Thermodynamics, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

Interactions between ice and ocean have a major impact on the south polar ocean system. Over the large shelf areas of the antarctic continent, freezing of ocean water leads to salt rejection into the water. Higher saline shelf water is formed which later may contribute to the Antarctic Bottom Water formation and subsequently to the thermohaline circulations of the global ocean system. The area beneath and in front of Filchner-Ronne Ice Shelf seems to play an important role within the global ocean system. A numerical model is presented which focuses especially on underwater ice platelet-ocean interactions in front of Filchner-Ronne Ice Shelf. The one dimensional model is based on the conservation of mass and momentum. It is suggested that the oceanographic conditions within the water do not change and that the ice crystal-ocean system keeps in a dynamic equilibrium.

51-745

Airborne radio echo investigations of a marine ice body.

Corr, H., Popple, M., Robinson, A., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.14-17, 10 refs.

DLC G890.F55.R47

Ice formation, Sea ice, Radio echo soundings, Ice cores, Ice salinity, Ice water interface, Oceanography, Antarctica—Ronne Ice Shelf

During the antarctic 1994-95 field season 8 dedicated airborne radio echo flights were flown from remote field camps over the western side of the Ronne Ice Shelf and its tributary ice streams. This paper deals with processed data from just one of these flights, labelled as Flight 13 in a figure. The existence of a large body of marine ice between the Evans and Rutford ice streams has been confirmed by direct measurements. The necessary oceanographic conditions for the deposition of this marine ice are discussed. The accretion mechanism for the low salinity marine ice found in the B13 ice core is thought to be by the accumulation of ice platelets. However, examination of the PRC at the meteoric-marine ice interface shows a high conductivity linear feature. A high conductivity at the interface suggest a salinity of the marine ice that is more appropriate for sea ice. A possible accretion mechanism would then be the congelation of sea ice at the ice-water interface.

51-746

Borehole logging of physical ice properties on Berkner Island, Antarctica: preliminary results.

Gerland, S., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.18-22, 4 refs.

DLC G890.F55.R47

Electrical resistivity, Ice physics, Boreholes, Recording, Temperature measurement, Antarctica—Berkner Island

Knowledge about physical properties of ice is crucial for the understanding of environmental and precipitation conditions in the past. Physical property logs enable stratigraphy studies as well as dating. Usually, logs from ice caps were obtained from core measurements after drillings. This study shows borehole logging with a newly designed borehole probe as a complement to core measurements. One of the major advantages of such borehole measurements is the possibility of filling gaps in data profiles from core measurements due to broken or non-recovered core material; furthermore, borehole logs contain a different, non-interrupted independent depth scale without gaps. Distorting effects from coring on core material are not present. Borehole measurements are relatively fast and enable physical property determination *in-situ.* Borehole measurements were performed at the south dome (Thyssenhöle) of Berkner I. during the antarctic field season 1994-95.

51-747

Interaction between ice-shelf cavities and the open ocean.

Grosfeld, K., Determann, J., Gerdes, R., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.23-30, 16 refs.

DLC G890.F55.R47

Ice shelves, Thickness, Simulation, Oceanography, Ice water interface, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

A 3D-Ocean Global Circulation Model was applied to an idealized ice shelf-ocean domain, where the ice-shelf cavity is coupled to the adjacent open ocean at a topographic barrier, the ice-shelf edge. Different experiments with changing ice-thickness distributions and sea-bottom topographies were performed to investigate the water-mass interaction process between the ice-shelf cavity and the open ocean. The simulations show, that the interaction of ice-shelf cavities and the adjacent open ocean depends very much on the bathymetry and distribution of the ice-shelf thickness. These results are consistent with observations that the main interaction between the Filchner-Ronne Ice shelf system and the adjacent open ocean is limited to the deep depressions in the west and east.

51-748

Airborne radio echo sounding during the Filchner V field season.

Hempel, L., Oerter, H., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.31-38, 3 refs.

DLC G890.F55.R47

Radio echo soundings, Ice shelves, Mapping, Mass balance, Mass flow, Thickness, Firn stratification, Antarctica—Ronne Ice Shelf

To calculate the mass balance of the Filchner-Ronne Ice Shelf, besides parameters, like flow velocity and deformation rates, very accurate data about the thicknesses of the ice streams flowing from the inner part of Antarctica into the ice shelf are also required. These data can be acquired with the new radio echo sounder onboard the aircraft "Polar 2". With this equipment it is possible to map ice thickness and internal layering down to 3.5 km depth at a horizontal trace distance of about 3 m and a vertical resolution of 10 to 20 m. During the Filchner V campaign the areas of investigations were located at the grounding line between Foundation Ice Stream and Institute Ice Stream and along the flow lines of the central Ronne Ice Shelf and perpendicular to these. In total 43.5 h of flying time yielded about 10,000 km of data profiles.

51-749

Approximation of ice sheet from ERS-1 radar altimeter in the Filchner Ronne Ice Shelf.

Ihde, J., Schirmer, U., Stefani, F., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.39-42, 11 refs.

DLC G890.F55.R47

Ice sheets, Ice surface, Height finding, Ice models, Airborne radar, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

With the help of satellite radar altimetry it is possible to cover the geometry of the surface of the Earth with high accuracy. For the radar altimeter of ERS-1, accuracies of a few centimeters were shown for the ocean areas and 1-2 decimeters for the flat ice sheets of Antarctica with the resolution of 5-10 km. These are the prerequisites for investigations of interaction of long-term changes of sea-level and ice heights. The long term goals of the investigations with satellite radar altimeter data are ice mass balance investigations of the antarctic continent. The results of this project show a high potential of ERS-1 radar altimeter precision over flat ice sheets.

51-750

Spot depth seismics over the southern and western Ronne Ice Shelf.

Johnson, M., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.43-45, 3 refs.

DLC G890.F55.R47

Seismic surveys, Ice shelves, Bottom topography, Ice water interface, Ocean bottom, Antarctica—Ronne Ice Shelf

During the 1994-95 field season 152 seismic measurements of the ice- and water-column thickness were made at 15 km intervals along a 2300 km traverse. This zig-zag traverse covered the southern and western Ronne Ice Shelf and the Evans Ice Stream. The objective was to record primary reflections from the ice- and sea-bed from which the two-way-travel (TWT) times to these interfaces may be picked clearly. Long record lengths, up to two and a half seconds, were used to record both the primary reflections and any of the weaker multiples that might be detected and used to aid the interpretation of the records. The topography map shows the preliminary seabed depths contoured at 100 m intervals over the area covered by the traverse. Although the results conform to the general trends estimated by Vaughan et al 1995 for the "Map of Subglacial and Seabed Topography", there are significant variations from this conception, which are described.

51-751

Analysis of glaciological features on Filchner-Ronne-Schelfeis based on Landsat and ERS-1 SAR image data.

Jonas, M., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.46-49, 3 refs.

DLC G890.F55.R47

LANDSAT, Ice shelves, Ice surface, Mass balance, Flow measurement, Topographic surveys, Image processing, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

The classification of surface features from remote sensing image data is part of the ESAMCA project (Exploitation of satellite altimetry for the monitoring of climate-related change of antarctic ice shelves), where the surface topography of Filchner-Ronne Ice Shelf is further investigated from ERS-1 radar altimetry and image data. Geo-referenced Landsat MSS (Multispectral Scanner) and ERS-1 SAR (Synthetic Aperture Radar) images are processed and interpreted with a digital image processing system. Some special influences of Berkner I. on the flow conditions and mass balance of the ice shelf are expressed by topographic structures. The influences discernible in the remote sensing data, which are different on Filchner-Ronne Ice Shelf, are discussed.

51-752

Ablation rates under the Ekström Ice Shelf deduced from different methods.

Lambrecht, A., Nixdorf, U., Zürn, W., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.50-56, 3 refs.

DLC G890.F55.R47

Ice shelves, Ice melting, Ablation, Ice sheets, Air ice water interaction, Air temperature, Glacier mass balance, Oceanography, Antarctica—Ekström Ice Shelf

The behavior of ice shelves plays an important role for the mass balance of the antarctic ice sheet as the outflow of the inland ice is hindered by the ice shelves. The interaction with the ocean influences the mass balance directly by accumulation or ablation processes and gives rise to water masses that fill the deep ocean. These cold water masses are of great importance in regard to the role of the oceans as heat storage in the global change context. The ablation rates for the Ekström Ice Shelf deduced from different methods are in very good agreement. By extrapolation of the temperature profile to the pressure melting point, an ablation rate of 65 cm/a was deduced for the time between May 1993 and June 1994. The comparison of the measured temperature profile of July 13, 1994 with theoretical calculated temperature profiles yields an ablation rate of 90 cm/a.

51-753

Glaciological investigations on the Foundation Ice Stream.

Mayer, C., Lambrecht, A., Oerter, H., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.57-63, 3 refs.

DLC G890.F55.R47

Ice shelves, Seismic surveys, Mass balance, Flow rate, Air ice water interaction, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

The oversnow traverse to the grounding line area of the Foundation Ice Stream in the 1994-95 field season continues earlier work on the central part of the Filchner-Ronne Ice Shelf. This area, together with the entrance area of the Möller Ice Stream, regulates the entire ice flow between Berkner I. and Henry Ice Rise and on to the ice front near the German Filchner Station. For a better understanding of the mass transport on this part of the ice shelf, detailed measurements have been taken along a flow line of the Foundation Ice Stream. Using geophysical and glaciological methods, the mass balance within the transition zone has been determined; a geodetic group carried out the velocity and deformation measurements. Together with accumulation and temperature data from firn cores drilled along the flow line it is planned to reconstruct the deposition and transportation history of the ice mass throughout the ice shelf.

51-754

Electrical logging and initial dating of ice cores from Berkner 94/95.

Miners, W.D., Mulvaney, R., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.64-66, 2 refs.

DLC G890.F55.R47

Ice cores, Ice dating, Electrical resistivity, Boreholes, Stratigraphy, Dielectric properties, Antarctica—Berkner Island

Using a recently built electrical bench the ice cores retrieved from the boreholes on the North Dome (R1) and the South Dome (B25) of Berkner I. were logged in the field. For each core, records were made of stratigraphy, ECM (Electrical Conductance Measurement, measures acid content) and DEP (Dielectric profiling, which responds to acid, ammonium and chloride). Results are tabulated and discussed.

51-755

2000 year record of biogenic sulfur, sea salt and nitrate from the central Filchner-Ronne Ice Shelf.

Minikin, A., Graf, W., Wagenbach, D., Oerter, H., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.67-73, 8 refs.

DLC G890.F55.R47

Ice cores, Ice composition, Paleoecology, Chemical analysis, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

During the 1991-92 field season a 320 m deep ice core, B15, was recovered from the central Filchner-Ronne Ice Shelf at the location D236 about 180 km from the shelf ice front. The drill site was chosen on a flow line originating most probably from the Möller Ice Stream and passing north of B15 through the former drill site B13. The drilling reached the marine shelf ice layer at a depth of 153 m. This study deals with chemical analyses on the upper, the meteoric part of the B15 core. The main objective is to try to reconstruct the paleo-environmental conditions in the Weddell Sea region over the last one or two thousand years.

51-756

Berkner Island Ice Core Project: report and some initial results.

Mulvaney, R., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.74-79, 5 refs.

DLC G890.F55.R47

Ice cores, Ice composition, Paleoclimatology, Climatic changes, Low temperature research, Antarctica—Berkner Island

The objective of the Berkner Island Ice Core Project is to reconstruct a high resolution record of climate and environmental change on timescales extending from centuries to several thousand years. Berkner I. lies adjacent to the Weddell Sea: ice core records from this island will help elucidate the role of the Weddell Sea in long-term climate change over West Antarctica. Such records will provide a basis for understanding the mechanisms driving both climate and coupled biogeochemical cycles, and will allow recent climate trends to be viewed in the perspective of longer term trends and variability of the climate system. The site also serves as a valuable link between existing ice core records from the Antarctic Peninsula and those from continental ice sheet locations, particularly the future planned ice core program in Queen Maud Land (EPICA).

51-757

Analysis of a 22-month thermistor cable record from the ocean beneath Site 2, Ronne Ice Shelf.

Nicholls, K.W., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.80-86, 3 refs.

DLC G890.F55.R47

Thermistors, Water temperature, Seasonal variations, Oceanography, Ice shelves, Flow rate, Ice water interface, Antarctica—Ronne Ice Shelf

During the austral summer of 1991-92 a hot-water drill was used to create an access hole at Site 2, Ronne Ice Shelf. The ice was found to be 541 m thick, overlying a water column about 380 m deep. Using oceanographic probes lowered into the water via the access hole a sequence of CTD profiles were made, and several water samples were retrieved. At the end of the measurement period thermistor cables were lowered into the borehole and allowed to freeze in place. One of the cables extended to within 40 m of the sea floor, with thermistors spaced at approximately 35 m intervals through the water column. It is the analysis of a 22-month record from this cable that is the subject of this report. By comparing the thermistor cable results with the temperature profiles from the CTD measurements it seems that the worst affected thermistor was the deepest, suffering a shift equivalent to 0.10°C. In this report the authors are concerned more with the temperature variability than the absolute values.

51-758

Deployment of oceanographic-glaciological strings under the Filchner-Ronne-Schelfeis in 1995.

Nixdorf, U., Rohardt, G., Lambrecht, A., Oerter, H., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.87-90, 5 refs.

DLC G890.F55.R47

Ice shelves, Subglacial drainage, Ablation, Heat transfer, Moorings, Ice water interface, Ice models, Oceanography, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

The lower side of ice shelves is very important for mass balance studies of the antarctic ice sheet; subglacial accumulation as well as ablation result in considerable mass transformations. The melting of ice shelves plays a major role in the process of the formation of Antarctic Bottom Water (AABW) that fills the deep ocean. These processes are studied by various models. In order to verify these models by field data, accumulation and ablation as well as mass, salt and heat transport under the ice shelves were measured by deployment of two moorings under the Ronne Ice Shelf at locations with subglacial accumulation and subglacial ablation.

51-759

German Filchner V Campaign in 1995: an overview and preliminary results from Berkner Island.

Oerter, H., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.91-96, 6 refs.

DLC G890.F55.R47

Low temperature research, Ice shelves, Ice water interface, Geodetic surveys, Snow density, Snow temperature, Ice cores, Electrical resistivity, Paleoclimatology, Antarctica—Berkner Island

The three main topics of the 1995 German expedition to the Filchner-Ronne Ice Shelf were: interaction between ice shelf and ocean, studied by means of hot-water-drilling and oceanographic strings under the ice shelf; mass input across the grounding zone of Foundation Ice Stream and Möller Ice Stream, investigated by means of geodetic surveying, geophysical and glaciological investigations as well as air-borne radio-echo soundings for ice thickness determination; and climate history of the millennium, archived in an ice core of Berkner I. Results of this investigation are presented.

51-760

Geodetic work at the ERS/VLBI Station O'Higgins.

Reinhold, A., Beyer, L., Ihde, J., Wojdziak, R., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.97-100, 5 refs.

DLC G890.F55.R47

Research projects, Geodetic surveys, Electronic equipment, Remote sensing, Tectonics, Data processing, Antarctica—Bernardo O'Higgins Station, Antarctica—Bransfield Strait

The radiotelescope at O'Higgins was planned and realized as a receiving ground station for ERS-1 SAR data and as a geodetic VLBI station. An antenna was installed under the project management of IFAG under the extreme climatic conditions of Antarctica near the Chilean Bernardo O'Higgins Station in 1990-91. The antenna has been operational since Oct. 1991 for SAR-data acquisition and since Jan. 1992 for geodetic VLBI. The inauguration of the station was on Jan. 29, 1993. Step by step, the infrastructure and the station equipment have been extended and additional geodetic instruments have been installed. International VLBI experiments and GPS measurements are discussed.

51-761

Geodetic fieldwork along Foundation Ice Stream.

Riedel, B., Karsten, A., Ritter, B., Niemeier, W., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.101-106, 3 refs.

DLC G890.F55.R47

Ice shelves, Geodetic surveys, Strain tests, Velocity measurement, Height finding, Topography, Traverses, Antarctica—Foundation Ice Stream

The registration of geometry of the grounding line and its changes with satellite and terrestrial observations was the main emphasis of the geodetic fieldwork in 1995. The examinations for the geometry contained the position (Λ, Φ, h), the height above sea level (H) and the surface topography. Changes of geometry were defined as the determination of flow velocity, strain and tidal deflection (Δh). The grounding line area (grounding zone) was reached by a SkiDoo-traverse from the Filchner station along former deformation figures following a flow line of Foundation Ice Stream to an area of 5°80 km^2 at 83° 10'S.

51-762

Experimental fracture and mechanics of antarctic ice.

Rist, M.A., Sammonds, P.R., Murrell, S.A.F., Meredith, P.G., Oerter, H., Doake, C.S.M., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.107-110, 3 refs.

DLC G890.F55.R47

Experimentation, Fracturing, Strain tests, Ice cores, Ice mechanics, Rheology, Crevasses, Antarctica—Ronne Ice Shelf

The deep-hole coring expeditions of the Alfred-Wegener Institute to the Ronne Ice Shelf in 1990 and 1992 have made available sufficient quantities of large-diameter ice core to facilitate the examination of the scale-independent fracture toughness, as well as the short-term rheology, of antarctic ice. The aim is to determine ice material properties that can be directly applied to help explain the mechanics of specific ice shelf processes such as crevasse formation and tidal flexure. Experimental methodology and preliminary fracture results are discussed.

51-763

Review of the Münster airborne radio-echo sounding-data set: marine ice beneath Filchner-Schelfeis; bottom reflectivity and internal structures of Berkner Island.

Sandhäger, H., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.111-114, 8 refs.

DLC G890.F55.R47

Ice shelves, Subglacial observations, Radio echo soundings, Airborne radar, Bottom topography, Electromagnetic properties, Ice cover thickness, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

In the course of a long-term project covering three field seasons, the University of Münster had carried out extensive airborne radio-echo soundings (RES) over the Filchner-Ronne Ice Shelf. The data set was reviewed, leading to three essential conclusions which are considered to be of significance for future ice dynamic and oceanographic studies as well as for investigations of the climatic history of the southern Weddell Sea.

51-764

Basal melting at grounding line of Rutford Ice Stream from seismic surveys.

Smith, A.M., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.115-118, 8 refs.

DLC G890.F55.R47

Ice shelves, Ice melting, Seismic surveys, Ice water interface, Subglacial drainage, Antarctica—Rutford Ice Stream, Antarctica—Ronne Ice Shelf

Melting of ice from the base of ice shelves is important for two reasons: firstly, for its contribution to the mass balance of the antarctic ice sheet; and secondly for its effect in modifying the water masses of the antarctic continental shelf and the world's deep oceans. Rutford Ice Stream flows into the SW corner of the Ronne Ice Shelf. A 4 km, single-fold seismic reflection profile was acquired in Feb. 1993, which crosses the grounding line. The ice bottom reflection and its ghost are clear. A number of reflections can be seen within the ice, between 100 and 250 m above the ice base. What causes them is not clear, but possibilities are suggested which include entrained moraine or a change in the ice fabric. Whatever the cause, if the reflectors are assumed to be isochrons within the ice, and if their geometry is known, then the pattern of convergence between these reflections and the ice base will show the combined effect of basal melting and internal deformation within the ice column. A comparison is made with data from the grounded ice further upstream, where orthogonal, intersecting seismic profiles have been acquired.

51-765

Geoid determination in the Filchner Ronne Ice Shelf.

Stefani, F., Ihde, J., Schirmer, U., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.119-122, 7 refs.

DLC G890.F55.R47

Ice shelves, Height finding, Geodetic surveys, Ice models, Gravity anomalies, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

The knowledge of the geoid as a reference frame for the polar ice heights and the mean sea level is of considerable importance for understanding the interaction between climate related changes of both quantities. A new geoid in the Filchner-Ronne Ice Shelf area is determined by spectral combination of the long wavelength components from the OSU91A model with the short wavelength components from a density layer model with regional isostatic compensation. The a priori unknown degree of regionality is inferred from the comparison of calculated and measured gravity anomalies.

51-766

First results of short pulse radio echo sounding on the top of Berkner Island.

Steinhage, D., Blindow, N., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.123-126.

DLC G890.F55.R47

Ice sheets, Radio echo soundings, Topographic surveys, Topographic maps, Bedrock, Bottom topography, Ice cores, Ice cover thickness, Electromagnetic properties, Antarctica—Berkner Island

Topography and ice thickness of Berkner I. have been investigated during the summers 1985-86 and 1989-90 on approximately 5,000 km of aerogeophysical flight tracks. The maximum ice thickness is just above 1,000 m, the mean ice thickness is about 780 m. In connection with the core drillings on the domes the stratigraphy in the ice is considered to be of special interest. By means of the short pulse electromagnetic reflection method (EMR), layers in the ice and the bedrock can be mapped continuously. A total depth of about 1,000 m is well in the range of the EMR-system. Operating at a center frequency of 30 MHz such a radar system achieves a relative precision in depth of about 1 m and a resolution of neighboring layers of about 2.5 m after processing.

51-767

Nordic contributions to EPICA Dronning Maud Land (DML) site survey (Extended abstract).

Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.127-128.

DLC G890.F55.R47

Low temperature research, Ice surveys, Topographic surveys, Weather observations, Antarctica—Queen Maud Land

This extended abstract gives an overview of the plans for the Nordic countries contribution to EPICA site survey in Queen Maud Land as they were presented at the 10th FRISP-meeting in Leipzig. The presented plans are a status per medio June 1995 and include activities for the three coming austral summer seasons, 1995-96, 1996-97 and 1997-98.

51-768

Ecological implications of a latitudinal gradient in the inter-annual climatic variability: a test using fractal and chaos theories.

Ferguson, S.H., Messier, F., *Ecography,* Dec. 1996, 19(4), p.382-392, 74 refs.

Climatology, Climatic changes, Degree days, Distribution, Lake ice, Freezeup, Ecology, Seasonal variations, Environmental impact, Fractals, Statistical analysis, Correlation

51-769

Influence of sulphur and heavy metal emissions from Monchegorsk, northwest Russia, on percolation water quality in *Pinus sylvestris* stands.

Lindroos, A.J., Derome, J., Nikonov, V., Niska, K., *Scandinavian journal of forest research,* 1996, 11(2), p.97-103, 19 refs.

Subpolar regions, Plant ecology, Forest soils, Forest ecosystems, Air pollution, Aerosols, Metals, Sedimentation, Soil water, Water chemistry, Leaching, Sampling, Environmental tests, Russia—Kola Peninsula

51-770

Production losses due to a summer frost in a *Salix viminalis* short-rotation forest in southern Sweden.

Verwijst, T., Elowson, S., Li, X.M., Leng, G.Y., *Scandinavian journal of forest research,* 1996, 11(2), p.104-110, 23 refs.

Forest ecosystems, Trees (plants), Plant tissues, Sampling, Growth, Biomass, Frost, Cold weather survival, Damage, Classifications, Plant physiology, Statistical analysis, Sweden

51-771

Dependence of dormancy release on temperature in different origins of *Pinus sylvestris* and *Betula pendula* seedlings.

Leinonen, I., *Scandinavian journal of forest research,* 1996, 11(2), p.122-128, 24 refs.

Forestry, Plant ecology, Growth, Trees (plants), Plant tissues, Cooling, Frost resistance, Temperature effects, Simulation, Low temperature tests

51-772

Geomorphological evolution of a dynamic landscape: the Cairngorm Mountains, Scotland.

Brazier, V., Gordon, J.E., Hubbard, A., Sugden, D.E., *Botanical journal of Scotland,* 1996, 48(1), p.13-30, Refs. p.26-30.

Geomorphology, Glacial geology, Alpine glaciation, Mountain glaciers, Pleistocene, Glaciation, Glacier oscillation, Glacial erosion, Periglacial processes, Landforms, Landscape development, United Kingdom—Cairngorm Mountains

51-773

Spatial and altitudinal gradients of climate in the Cairngorms—observations from climatological and automatic weather stations.

McClatchey, J., *Botanical journal of Scotland,* 1996, 48(1), p.31-49, Refs. p.46-49.

Climatology, Mountains, Meteorological data, Weather stations, Alpine landscapes, Snow accumulation, Snow cover effect, Ice formation, Glaze, Seasonal variations, Altitude, Heat flux, Weather observations, United Kingdom—Cairngorm Mountains

51-774

Late-Quaternary vegetation dynamics of the Cairngorms.

Bennett, K.D., *Botanical journal of Scotland,* 1996, 48(1), p.51-63, Refs. p.60-63.

Paleoecology, Paleobotany, Paleoclimatology, Climatic changes, Alpine landscapes, Vegetation patterns, Quaternary deposits, Geochronology, United Kingdom—Cairngorm Mountains

51-775

Palaeoecological studies in the Cairngorms—summary and future research needs.

Birks, H.J.B., *Botanical journal of Scotland,* 1996, 48(1), p.117-126, 22 refs.

Paleobotany, Paleoecology, Climatic changes, Pleistocene, Alpine landscapes, Quaternary deposits, Vegetation patterns, Research projects, Environmental protection, United Kingdom—Cairngorm Mountains

51-776

Summary report on the mummified glacier corpse found at Hauslabjoch in the Ötztal Alps.

Spindler, K., *Eclogae geologicae Helvetiae,* 1995, 88(3), p.699-709, With German summary. 9 refs.

Glaciology, Glacial deposits, Sediments, Cryobiology, X ray analysis, Preserving, Mountain glaciers, Alpine landscapes, Alps

51-777

Global climatic change on Mars.

Kargel, J.S., Strom, R.G., *Scientific American,* Nov. 1996, 275(5), p.80-88, 4 refs.

Mars (planet), Planetary environments, Regolith, Geologic processes, Climatology, Climatic changes, Hydrologic cycle, Glaciation, Ice sheets, Extraterrestrial ice, Geomorphology

51-778

Albert Pissart and his role in the study of periglacial environments. [Albert Pissart et son rôle dans l'étude des milleux périglaciaires]

Coutard, J.P., French, H.M., Koster, E., Lautridou, J.P., Ozouf, J.C., *Permafrost and periglacial processes,* Jan.-Mar. 1996, 7(1), p.1-12, In English and French with French summary. Refs. p.9-12.

Periglacial processes, Geocryology, Research projects, Pleistocene, Paleoclimatology, Geomorphology, Climatic factors

51-779

Late Pleistocene glaciation of the arctic shelf and adjacent plains of northern Eurasia: cryogenic and tectonic evidence.

Danilov, I.D., Ruzhanskiĭ, V.E., *Permafrost and periglacial processes,* Jan.-Mar. 1996, 7(1), p.13-19, With French summary. 16 refs.

Pleistocene, Geomorphology, Landscape development, Cryogenic soils, Periglacial processes, Permafrost structure, Sedimentation, Frozen ground mechanics, Deformation, Tectonics, Russia—Siberia

51-780

Forms of frost creep in the massifs of Chambeyron and La Mortice, Haute-Ubaye, southern French Alps. [Modalités de la cryoreptation dans les massifs du Chambeyron et de La Mortice, Haute-Ubaye, Alpes Françaises du Sud]

Coutard, J.P., Ozouf, J.C., Gabert, P., *Permafrost and periglacial processes,* Jan.-Mar. 1996, 7(1), p.21-51, In French with English summary. 34 refs.

Alpine landscapes, Cryoturbation, Periglacial processes, Slope processes, Solifluction, Frost action, Soil creep, Patterned ground, Sorting, France—Alps, France—Haute-Ubaye

51-781

Electric prospecting of the rock glaciers of the Saint-Anne cirque (Queyras, southern Alps, France). [Prospection électrique sur les glaciers rocheux du cirque de Sainte-Anne (Queyras, Alps de Sud, France)]

Assier, A., Fabre, D., Evin, M., *Permafrost and periglacial processes,* Jan.-Mar. 1996, 7(1), p.53-67, In French with English summary. 15 refs.

Periglacial processes, Alpine landscapes, Geomorphology, Cirques, Topographic surveys, Rock glaciers, Geocryology, Permafrost indicators, Sounding, Electrical resistivity, Ground ice, Ice detection, France—Alps

51-782

Rock glaciers in the Central Tianshan Mountains, China.

Zhu, C., Zhang, J.X., Cheng, P., *Permafrost and periglacial processes,* Jan.-Mar. 1996, 7(1), p.69-78, With French summary. 9 refs.

Geocryology, Alpine landscapes, Periglacial processes, Rock glaciers, Classifications, Geomorphology, Talus, Frozen ground mechanics, Structural analysis, Sounding, Electrical resistivity, Geophysical surveys, Altitude, Snow line, China—Tian Shan

51-783

Rates of periglacial processes in the Central Tianshan, China.

Zhu, C., *Permafrost and periglacial processes,* Jan.-Mar. 1996, 7(1), p.79-94, With French summary. 14 refs.

Periglacial processes, Geomorphology, Geophysical surveys, Slope processes, Bedrock, Soil creep, Flow measurement, Cryoturbation, Talus, Solifluction, Frost weathering, China—Tian Shan

51-784

Relationship between the distribution of periglacial landforms and glaciation history, Fildes Peninsula, King George Island, Antarctica.

Zhu, C., Cui, Z.J., Zhang, J.X., *Permafrost and periglacial processes,* Jan.-Mar. 1996, 7(1), p.95-100, With French summary. 9 refs.

Periglacial processes, Geomorphology, Moraines, Glacial erosion, Topographic features, Patterned ground, Soil structure, Landforms, Profiles, Antarctica—King George Island

Three kinds of profile assemblage features on Fildes Peninsula, King George I., show that periglacial landforms have an internal relationship in genesis. For example, where there is a rich weathering debris, the dominant landforms are talus, black slopes, mass movement features, and mega-grained sorted forms. Where the debris material is silty, fine-grained periglacial forms (for example, gelifluction steps and striated soils) dominate. Where the debris source is limited, talus only appears at the southeast side of periglacial tors and hilltops; the major periglacial forms are striated soils and muddy sorted circles. In general, periglacial landforms show a difference between stoss and leeward slopes. (Auth. mod.)

51-785

Energy balance of a melting snowpack in the French Pyrenees during warm anticyclonic conditions.

McGregor, G.R., Gellatly, A.F., *International journal of climatology,* Apr. 1996, 16(4), p.479-486, 22 refs.

Climatology, Insolation, Alpine landscapes, Atmospheric circulation, Snow cover stability, Snowmelt, Surface energy, Heat balance, Radiation balance, Snow air interface, Diurnal variations, France—Pyrenees

51-786

Fast-growth technique for ice single crystals.

Khusnatdinov, N.N., Petrenko, V.F., *Journal of crystal growth,* June 1996, 163(4), p.420-425, 12 refs.

Ice physics, Ice crystal growth, Laboratory techniques, Ice water interface, Phase transformations, Thermodynamic properties, Vapor pressure, Two dimensional nucleation, Heat flux, Thermal diffusion

51-787

Ice-free cryo-cooling of protein crystals.

Carr, P.D., et al, *Journal of applied crystallography,* Aug. 1, 1996, 29(pt.4), p.469-470, 4 refs.

Cryogenics, Crystals, Freezing, Preserving, Sampling, Glaze, Ice prevention, Laboratory techniques, Turbulent flow, Flow control

51-788

Biodiversity and biogeography of planktonic dinoflagellates in the Arctic Ocean.

Okolodkov, IU.B., Dodge, J.D., *Journal of experimental marine biology and ecology,* Sep. 15, 1996, 202(1), p.19-27, 16 refs.

Marine biology, Plankton, Biomass, Biogeography, Sampling, Ecosystems, Classifications, Statistical analysis, Arctic Ocean

51-789

Fifty years of mass balance and glacier front observations at the Tarfala Research Station.

Holmlund, P., Karlén, W., Grudd, H., *Geografiska annaler,* 1996, 78A(2-3), p.105-114, 48 refs.

Glaciology, Glacier surveys, Photogrammetric surveys, Glacier mass balance, Glacier oscillation, Ice edge, Air temperature, Correlation, Seasonal variations, Sweden—Storglaciären

51-790

Air temperature at Tarfala Research Station 1946-1995.

Grudd, H., Schneider, T., *Geografiska annaler,* 1996, 78A(2-3), p.115-120, 9 refs.

Climatology, Subpolar regions, Air temperature, Temperature measurement, Seasonal variations, Indexes (ratios), Sweden

51-791

Some aspects of energy balance and ablation of Storglaciären, northern Sweden.

Hock, R., Holmgren, B., *Geografiska annaler,* 1996, 78A(2-3), p.121-131, 36 refs.

Glacial meteorology, Glacier surveys, Surface energy, Glacier ablation, Glacier heat balance, Radiation balance, Ice air interface, Turbulent exchange, Ice heat flux, Wind factors, Statistical analysis, Surface roughness, Sweden—Storglaciären

51-792

Robustness of one-dimensional, time-dependent, ice-flow models: a case study from Storglaciären, northern Sweden.

Stroeven, A.P., *Geografiska annaler,* 1996, 78A(2-3), p.133-146, 50 refs.

Glaciology, Glacier flow, Glacier oscillation, Climatic factors, Mathematical models, Glacier mass balance, Basal sliding, Velocity, Ice solid interface, Glacier beds, Topographic effects, Sweden—Storglaciären

51-793

Radar surveys on Scandinavian glaciers, in search of useful climate archives.

Holmlund, P., Näslund, J.O., Richardson, C., *Geografiska annaler,* 1996, 78A(2-3), p.147-154, 26 refs.

Glacier surveys, Radar echoes, Geophysical surveys, Sensor mapping, Ice thermal properties, Temperature distribution, Stratification, Glacier thickness, Glacier surfaces, Sounding, Sweden—Mårmaglaciären, Sweden—Storglaciären

51-794
Suspended sediment transport in the Storglaciären drainage basin.
Schneider, T., Bronge, C., *Geografiska annaler,* 1996, 78A(2-3), p.155-161, 25 refs.
Glacial hydrology, Glacier surveys, Glacier flow, Glacier beds, Glacial erosion, Sediment transport, Suspended sediments, Subsurface drainage, Sampling, Mathematical models, Statistical analysis, Sweden—Storglaciären

51-795
Excavation of the Storglaciären trough during the Quaternary.
Bronge, C., *Geografiska annaler,* 1996, 78A(2-3), p.163-169, 34 refs.
Pleistocene, Glacial geology, Glacial hydrology, Geomorphology, Glacier beds, Glacial erosion, Subglacial drainage, Sediment transport, Quaternary deposits, Sampling, Isotope analysis, Sweden—Storglaciären

51-796
Dynamics and hydrology of a small polythermal valley glacier.
Jansson, P., *Geografiska annaler,* 1996, 78A(2-3), p.171-180, 47 refs.
Glacier surveys, Glacial hydrology, Glacier flow, Velocity, Subglacial drainage, Water pressure, Glacier oscillation, Ice water interface, Topographic effects

51-797
Simulation of particle paths and deformation of ice structures along a flow-line on Storglaciären, Sweden.
Pohjola, V.A., *Geografiska annaler,* 1996, 78A(2-3), p.181-192, 30 refs.
Glacial hydrology, Glacier flow, Glacier surfaces, Ice veins, Ice mechanics, Ice structure, Crevasses, Ice deformation, Simulation, Mathematical models, Sweden—Storglaciären

51-798
Maps of Storglaciären and their use in glacier monitoring surveys.
Holmlund, P., *Geografiska annaler,* 1996, 78A(2-3), p.193-196, 13 refs.
Glacier surveys, Glacier mass balance, Glacier oscillation, Sensor mapping, Topographic maps, Photogrammetric surveys, Sweden—Storglaciären

51-799
Proceedings. Vol.1. [Diwujie Quanguo bingchuan dongtuxue dahui taolunji]
Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996, Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, 803p., In Chinese with English titles, summaries, and table of contents. Refs. passim. Edited by the Glaciology and Geocryology Branch of the Geographical Society of China (Zhongguo dili xuehui Bingchuan dongtu fenhui). For individual papers see 51-800 through 51-923.
Soil freezing, Frost heave, Frost protection, Soil stabilization, Permafrost distribution, Permafrost preservation, Frozen ground strength, Frozen ground compression, Frozen ground thermodynamics, Soil creep, Mountain glaciers, Glacial hydrology, Glacial meteorology, Glacier oscillation, Ice cores, Global warming, Paleoclimatology

51-800
Ground temperature changes of seasonally freeze-thaw layers and climate warming in northeast China in the past 40 years.
Zhou, Y.W., Gao, X.W., Wang, Y.X., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.3-10, In Chinese with English summary. 11 refs.
Active layer, Frozen ground temperature, Soil temperature, Air temperature, Temperature variations, Soil air interface, Snow cover effect, Frost penetration, Thaw depth, Global warming, Statistical analysis, China—Greater Khingan Range

51-801

Approach on permafrost degradation and environmental problems in the Tibetan Plateau.

Wang, S.L., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.11-17, In Chinese with English summary. 6 refs.

Steppes, Permafrost distribution, Permafrost preservation, Ground thawing, Soil conservation, Land reclamation, Desiccation, Human factors, Global warming, China—Qinghai-Xizang Plateau

51-802

Organic geochemistry and paleoenvironment changes revealed by the lacustrine sediments in the Qingshuihe permafrost region, Tibetan Plateau.

Lin, Q., Wang, G.S., Jin, H.J., Zhang, G., Geng, A.S., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.18-26, In Chinese with English summary. 4 refs.

Permafrost beneath lakes, Permafrost beneath rivers, Frozen ground chemistry, Lacustrine deposits, Bottom sediment, Soil composition, Soil dating, Geochemistry, Paleoclimatology, China—Qinghai-Xizang Plateau

51-803

Approximately analysing the future thermal regime of permafrost on the Tibetan Plateau under climate warming.

Li, S.X., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.27-34, In Chinese with English summary. 5 refs.

Permafrost heat balance, Permafrost distribution, Permafrost thickness, Permafrost forecasting, Frozen ground temperature, Soil air interface, Soil temperature, Global warming, Mathematical models, China—Qinghai-Xizang Plateau

51-804

Permafrost environment on the Tibetan Plateau since the last glacial maximum.

Zhao, X.F., Guo, D.X., Wang, S.L., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.35-42, In Chinese with English summary. 7 refs.

Permafrost distribution, Permafrost origin, Permafrost indicators, Periglacial processes, Loess, Eolian soils, Cryogenic soils, Human factors, Global change, Paleoclimatology, China—Qinghai-Xizang Plateau

51-805

Changes of natural and engineering environments in permafrost regions along the Qinghai-Tibet Highway.

Wang, G.S., Jin, H.J., Lin, Q., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.43-50, In Chinese with English summary. 16 refs.

Permafrost distribution, Permafrost beneath roads, Permafrost preservation, Permafrost forecasting, Global warming, China—Qinghai-Xizang Plateau

51-806

Emission of CH_4 and CO_2 in Qingshuihe, Tibetan Plateau.

Jin, H.J., Lin, Q., Wang, G.S., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.51-60, In Chinese with English summary. 16 refs.

Tundra soils, Tundra climate, Frozen ground chemistry, Active layer, Soil air interface, Permafrost mass transfer, Vapor transfer, Atmospheric composition, Global warming, China—Qinghai-Xizang Plateau

51-807

Observation and analysis of evaporation from the ground surface of Tanggula Pass in the centre of the Tibetan Plateau.

Zhang, Y.S., et al, Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.61-68, In Chinese with English summary. 3 refs.

Soil air interface, Moisture transfer, Vapor transfer, Evaporation, China—Qinghai-Xizang Plateau

51-808

Vegetation along the Qinghai-Tibet Highway and its relationship with desertification.

Yan, S.Y., Zhao, X.F., Wang, S.L., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.69-76, In Chinese with English summary. 3 refs.

Steppes, Tundra vegetation, Tundra climate, Vegetation patterns, Plant ecology, Permafrost distribution, Desiccation, China—Qinghai-Xizang Plateau

51-809

Characteristics of the discovered wedges in northern China and their meanings.

Guo, D.X., Zhao, X.F., Li, Z.F., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.77-84, In Chinese with English summary. 13 refs.

Ice wedges, Ice veins, Periglacial processes, Permafrost indicators, Paleoclimatology, China

51-810

Seasonal freezing of soils in Hexi Corridor, Gansu, China.

Qiu, G.Q., Zhao, L., Wang, S.J., Sheng, W.K., Yue, H.S., Jin, H.J., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.85-93, In Chinese with English summary. 7 refs.

Saline soils, Soil freezing, Seasonal freeze thaw, Frost penetration, Frost forecasting, Mathematical models, China—Qilian Mountains

51-811

Mass balance in the Xiao Dongkemadi Glacier recorded in ice cores.

Pu, J.C., Yao, T.D., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.94-98, In Chinese with English summary. 6 refs.

Mountain glaciers, Glacier surveys, Glacier oscillation, Glacier mass balance, Ice cores, China—Qinghai-Xizang Plateau

51-812

Climatic record in ice cores from west China since the Little Ice Age.

Yao, T.D., Shi, Y.F., Yang, Z.H., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.99-106, In Chinese with English summary. 6 refs.

Mountain glaciers, Glacial meteorology, Ice cores, Ice composition, Isotope analysis, Paleoclimatology, Global warming, China—Qinghai-Xizang Plateau

51-813

Application of REE geochemistry tracing for distinguishing the material originated regions of glacial dirty layer in the Tanggula Pass.

Long, J.P., Qin, D.H., Yao, T.D., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.107-112, In Chinese with English summary. 2 refs.

Glacial erosion, Sediment transport, Glacial till, Glacier ice, Ice sampling, Ice composition, Impurities, Geochemistry, China—Qinghai-Xizang Plateau

51-814

Chemical component and chronology of cave ice in Wudalianchi.

Pu, J.C., et al, Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.113-118, In Chinese with English summary. 6 refs.

Caves, Ice caves, Ice composition, Ice dating, Fossil ice, Sublimation, Atmospheric composition, Paleoclimatology, China—Heilongjiang Province

51-815

Preliminary study on the formation of cave ice found in lava tunnels in Wudalianchi City, northeast China.

Li, S.D., Cheng, G.D., Pu, J.C., Wang, Y.P., Liu, W., Wang, X., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.119-122, In Chinese with English summary. 2 refs.

Caves, Ice caves, Ice formation, Fossil ice, Ice composition, Ice dating, Volcanoes, Magma, China—Heilongjiang Province

51-816

Glacier and glacial meltwater runoff variations with climate fluctuations in the drainage area of the Urumqi River.

Liu, C.H., Chen, J.M., Jin, M.X., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.123-132, In Chinese with English summary. 10 refs.

Mountain glaciers, Glacier surveys, Glacier oscillation, Glacial hydrology, Glacial meteorology, Glacial rivers, Meltwater, Runoff, Statistical analysis, China—Tian Shan

51-817

Environmental changes in the headwaters of the Urumqi River Tianshan Mt., during the last 10000 years.

Zhao, L., Qiu, G.Q., Jin, H.J., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.133-140, In Chinese with English summary. 23 refs.

Glacial deposits, Glacial till, Outwash, Cryogenic soils, Soil composition, Soil dating, Boreholes, Palynology, Paleobotany, Paleoclimatology, China—Tian Shan

51-818

General introduction to glacial debris flows in Tianshan Mountains, Central Asia.

Deng, Y.X., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.141-149, In Chinese with English summary. 6 refs.

Glacial hydrology, Lake bursts, Mudflows, Accidents, Tian Shan

51-819

Preliminary studies on the extra-continental type glaciers in the west Kunlun Mountains.

Su, Z., Liu, S.Y., Xie, Z.C., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.150-158, In Chinese with English summary. 5 refs.

Glacier surveys, Mountain glaciers, Glacial hydrology, Glacial meteorology, Glacier mass balance, Glacier formation, Ice temperature, Air temperature, China—Kunlun Mountains

51-820

Reconstruction of precipitation in Guliya Ice Cap, northwest China.

Jiao, K.Q., Yao, T.D., Shi, W.L., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.159-164, In Chinese with English summary. 13 refs.

Mountain glaciers, Glacier oscillation, Glacial meteorology, Glacier alimentation, Firn stratification, Ice cores, Precipitation (meteorology), Paleoclimatology, China—Kunlun Mountains

51-821

Ion eluviation in the snow on the Xiao Dongkemadi Glacier.

Huang, C.L., Pu, J.C., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.165-169, In Chinese with English summary. 2 refs.

Mountain glaciers, Glacial hydrology, Glacier ice, Ice composition, Ice cores, Snow ice interface, Snow hydrology, Snow composition, Snow permeability, Ion diffusion, Ion density (concentration), China—Qinghai-Xizang Plateau

51-822

Structure and distribution of snow cover in the Tianshan Mountains.

Zhang, Z.Z., Severskiĭ, I.V., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.170-174, In Chinese with English summary. 10 refs.

Snow surveys, Snow cover distribution, Snow cover structure, Metamorphism (snow), Snow cover stability, Tian Shan

51-823

Distribution and features of glacier resources in northwest China.

Yang, H.A., Mi, D.S., Kang, X.C., Li, Z.Q., Liu, C.H., Xie, Z.C., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.175-182, In Chinese with English summary. 6 refs.

Mountain glaciers, Glacier surveys, Glacier oscillation, Glacial hydrology, Ice volume, Water reserves, China—Xinjiang, China—Qinghai Province, China—Gansu Province

51-824

Glacier distribution features in the mountain regions of northwest China analysed by the glacier database.

Liu, Z.X., Wang, W.T., Shao, W.Z., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.183-189, In Chinese with English summary. 11 refs.

Mountain glaciers, Glacier surveys, Glacier oscillation, Snow line, Data processing, Statistical analysis, China—Kunlun Mountains, China—Tian Shan

51-825

Characteristics of $\delta^{18}O$ in precipitation and glacial meltwater at Tanggula Mountains observed in the late summer of 1993.

Tian, L.D., Yao, T.D., Yang, Z.H., Pu, J.C., Zhang, Y.S., Ohata, T., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.190-196, In Chinese with English summary. 13 refs.

Mountain glaciers, Glacial meteorology, Glacial hydrology, Snow composition, Meltwater, Water chemistry, Atmospheric composition, Precipitation (meteorology), Isotope analysis, China—Qinghai-Xizang Plateau

51-826

Study on the mass balance of the Glacier No.1 at the headwaters of the Urumqi River using degree-day method.

Liu, S.Y., Ding, Y.J., Ye, B.S., Wang, N.L., Xie, Z.C., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.197-204, In Chinese with English summary. 18 refs.

Mountain glaciers, Glacier surveys, Glacier oscillation, Glacier mass balance, Glacial meteorology, Glacial hydrology, Snow line, Degree days, Statistical analysis, China—Tian Shan

51-827

New approach of analyzing the influence of climate change on the ELA: application of grey theory in glaciology.

Wang, N.L., Zhou, Y.B., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.205-212, In Chinese with English summary. 9 refs.

Mountain glaciers, Glacier surveys, Glacier oscillation, Glacier mass balance, Glacial meteorology, Snow line, Climatic changes, Climatic factors, Statistical analysis, Mathematical models, China—Tian Shan

51-828

Stable isotope fractionation in falling water drops under clouds.

Zhang, X.P., Yao, T.D., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.213-218, In Chinese with English summary. 6 refs.

Atmospheric circulation, Atmospheric composition, Cloud physics, Precipitation (meteorology), Evaporation, Oxygen isotopes, Isotope analysis, Mathematical models

51-829

Aridity variation in the Guliya Ice Cap region approached by pH and electric conductivity in ice core.

Sheng, W.K., Yao, T.D., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.219-226, In Chinese with English summary. 8 refs.

Mountain glaciers, Glacial meteorology, Ice cores, Ice composition, Ice electrical properties, Desiccation, Climatic changes, Paleoclimatology, China—Kunlun Mountains

51-830

Lower mean annual ground temperature beneath a block stream in the Kunlun Pass, Qinghai Province, China.

Harris, S.A., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.227-237, 15 refs.

Rock glaciers, Rock streams, Alpine tundra, Discontinuous permafrost, Permafrost thermal properties, Frozen ground temperature, Soil temperature, Solifluction, China—Kunlun Mountains

51-831

Reasons for the descent of permafrost table in Buqu River Valley.

Zhao, J.J., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.238-242, In Chinese with English summary. 4 refs.

Permafrost beneath roads, Permafrost distribution, Permafrost thickness, Permafrost depth, Ground thawing, Climatic factors, China—Qinghai-Xizang Plateau

51-832

Preliminary study on regeneration mechanisms of gold placers in permafrost regions—with special reference to the northern part of the Da and Xiao Hinggan Mountains.

Zhang, B.L., Wang, C.H., Song, C.C., Chunyu, S.J., Zhang, A.X., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.243-246, In Chinese with English summary. 9 refs.

Placer mining, Permafrost preservation, Land reclamation, China—Greater Khingan Range

51-833

Geochemical characteristics of snow-ice soluble impurities in King George Island Ice Cap, Antarctica.

Kang, J.C., et al, Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.247-254, In Chinese with English summary. 12 refs.

Polar atmospheres, Marine atmospheres, Atmospheric composition, Snow ice interface, Snow composition, Firn stratification, Ice cores, Ice composition, Impurities, Ion density (concentration), Antarctica—King George Island

Chemical analyses for soluble impurities of snow-ice cores from the small dome (250 m a.s.l.) and the main dome (702 m a.s.l.) of King George Island Ice Cap show that the major ions in the ice cap are Na^+, Ca^{2+}, K^+, Mg^{2+}, NH_4^+, H^+, SO_4^{2-}, NO_3^-, Cl^- and Br^-, among them, the concentration of Na^+ plus Cl^- is 5-7 times more than the total concentration of the rest ions, and Cl^-/Na^+ is similar to the ratio of sea water. It means that the soluble impurities are mainly derived from sea salt. The concentration of Na^+ or Cl^- is measured in μg/g at both the small dome and the surface layer of the main dome. The average concentration of Br^- is 10-12 ng/g, which is less then reported in other areas of the Antarctic. (Auth. mod.)

51-834

Glaciolgical characteristics of the Collins Ice Cap, King George Island, Antarctica.

Wen, J.H., et al, Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.255-262, In Chinese with English summary. 24 refs.

Glacier surveys, Glacial meteorology, Glacier mass balance, Glacier alimentation, Glacier ablation, Ice cores, Ice temperature, Antarctica—King George Island

Vertical temperature gradients in the Collins Ice Cap are about 0.67°C/100 m; the temperature jump is only 0.25°C. Precipitation on the ice cap is plentiful. In summer, most of the precipitation on the small dome is liquid, but on the main dome is solid. In winter, solid precipitation is predominant on the whole ice cap. Net accumulation of the Collins Ice Cap increases rapidly with an increase of elevation and the mean annual accumulation rate at the top of the main dome is 2,480 $kg/m^2/a$. The small dome and main dome have different mass balance features. The small dome receives most of its mass nourishment in the cold season, while the main dome is nourished all year round. Surficial melting is the main form of ablation on the small dome, but on the main dome iceberg calving is more important. (Auth. mod.)

51-835

Mapping snow mountains in China.

Mi, D.S., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.263-268, In Chinese with English summary. 8 refs.

Snow surveys, Snow cover distribution, Mountains, Topographic maps, Data processing, China

51-836

Analysis of snow cover variation in the Tibetan Plateau using NOAA satellite data.

Li, Z., Sun, W.X., Zeng, Q.Z., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.269-274, In Chinese with English summary. 6 refs.

Snow surveys, Snow cover distribution, Terrain identification, Spaceborne photography, China—Qinghai-Xizang Plateau

51-837

Development and application of BZXJ super light ice core drill.

Zhu, G.C., Han, J.K., Liang, S.Y., Gao, X.S., Zhang, Y.L., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.275-280, In Chinese with English summary. 3 refs.

Ice coring drills, Portable equipment, Coring, Rotary drilling, Ice cores

51-838

Analysis of laboratory tests for reducing frost heave of soils with geosynthetics.

Chen, L., Zheng, J.Q., Li, G.X., Bu, F.H., Gao, Y., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.283-290, In Chinese with English summary. 4 refs.

Soil freezing, Frost heave, Frozen ground strength, Frozen ground compression, Frost protection, Soil stabilization, Geotextiles, Environmental tests

51-839

Achievement and prospect on the studies of technological measures against frost damage for hydro-structures in seasonally frozen ground regions.

Xu, S.X., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.291-298, In Chinese with English summary.

Soil freezing, Frost heave, Frozen ground strength, Frozen ground compression, Hydraulic structures, Foundations, Frost protection, Soil stabilization

51-840

Method for protecting the ground from heavy seasonally freezing.

Sharkhuu, N., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.299-302, 1 ref.

Soil freezing, Frost penetration, Frost protection, Thermal insulation, Soil stabilization, Mongolia

51-841

Ideal and practical thermal insulating material against frost heaving.

Yu, S.C., Li, P., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.303-306, In Chinese with English summary. 2 refs.

Soil freezing, Frost heave, Frost protection, Soil stabilization, Thermal insulation

51-842

Frost heaving forces on strip shallow foundation and building deformation.

Jiang, H.J., Chen, F.J., Cheng, E.Y., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.307-310, In Chinese with English summary.

Buildings, Foundations, Soil freezing, Frost heave, Settlement (structural)

51-843

Application of fuzzy mathematics in frost heaving forecast.

Tang, S.C., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.311-317, In Chinese with English summary.

Soil freezing, Frost heave, Frost forecasting, Statistical analysis

51-844

Full-scale test on retaining wall reinforced with geotextile against frost damage.

Chen, L., Zheng, J.Q., Li, G.X., Zhou, D.Y., Gao, Y., Bu, F.H., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.318-324, In Chinese with English summary. 2 refs.

Channels (waterways), Soil freezing, Frost heave, Frost protection, Frozen ground compression, Earth fills, Soil stabilization, Geotextiles

51-845

Determination of design frozen depth for canal.

Li, A.G., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.325-332, In Chinese with English summary. 5 refs.

Channels (waterways), Soil freezing, Frost penetration, Frost protection, Design criteria, China

51-846

Permafrost degradation and highway.
Zhu, L.N., Wu, Z.W., Zang, E.M., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.333-340, In Chinese with English summary. 13 refs.
Permafrost distribution, Permafrost beneath roads, Permafrost forecasting, Permafrost preservation, Ground thawing, Global warming, Highway planning, Road maintenance, China

51-847

Design and application on crack treatment of steel fiber cement concrete pavement in permafrost regions.
Luo, D., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.341-347, In Chinese with English summary.
Concrete pavements, Reinforced concretes, Cracking (fracturing), Permafrost beneath roads, Frost protection, Frost resistance, Road maintenance, China—Qinghai-Xizang Plateau

51-848

Quick construction method for shortening the curing period of the roadbed under asphalt pavement in permafrost regions.
Luo, D., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.348-352, In Chinese with English summary.
Pavements, Concrete curing, Winter concreting, Subgrade preparation, Road maintenance, China—Qinghai-Xizang Plateau

51-849

Application of coal ash to filling embankment in cold regions.
Fang, J.H., Wang, J.P., Liu, F., Wang, X.Y., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.353-357, In Chinese with English summary.
Embankments, Frost protection, Soil stabilization, Road maintenance

51-850

Determination of allowable frost-heave for cement concrete pavement.
Dai, H.M., Gao, W., Yang, M., Wang, X.L., Feng, L.S., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.358-364, In Chinese with English summary.
Concrete pavements, Subgrade soils, Frost heave, Frost penetration, Frost resistance, Frost protection, Subgrade maintenance, Road maintenance, China—Heilongjiang Province

51-851

Assessment of environmental engineering geology and engineering measures for frozen ground along the Qinghai-Tibet Highway.
Tong, C.J., Wu, Q.B., Liu, Y.Z., Zhang, J.Z., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.365-372, In Chinese with English summary. 10 refs.
Permafrost surveys, Permafrost distribution, Permafrost beneath roads, Permafrost preservation, Permafrost control, Engineering geology, Highway planning, Road maintenance, China—Qinghai-Xizang Plateau

51-852

Effect of climate warming on stability and durability of buildings in permafrost regions.
Wu, Q.B., Tong, C.J., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.373-376, In Chinese with English summary. 5 refs.
Permafrost beneath structures, Frozen ground strength, Ground thawing, Thaw weakening, Global warming

51-853

Experimental study on the quarried rock ventilated embankment in cold regions engineering.
Wang, G.S., Lin, Q., Jin, H.J., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.377-382, In Chinese with English summary. 23 refs.
Permafrost beneath roads, Permafrost preservation, Embankments, Rock fills, Aeration, Soil stabilization, Road maintenance

51-854

Discussion on the design principles of embankment paved with asphalt for Qinghai-Tibet Highway.
Zhang, J.Z., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.383-388, In Chinese with English summary. 4 refs.
Permafrost beneath roads, Permafrost preservation, Embankments, Soil stabilization, Thaw weakening, Road maintenance, China—Qinghai-Xizang Plateau

51-855

Application of geotextile to road engineering in permafrost regions.
Yuan, X.Z., Bai, Z.W., Guo, L.M., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.389-395, In Chinese with English summary. 4 refs.
Permafrost beneath roads, Permafrost preservation, Embankments, Frozen ground settling, Subgrade soils, Soil stabilization, Geotextiles, Thermal insulation, Road maintenance

51-856

Studies on the storage of keeping fruits and vegetables fresh by utilizing natural ice.
Li, L.T., Xue, W.T., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.396-402, In Chinese with English summary. 8 refs.
Ice thermal properties, Ice refrigeration, Artificial freezing, Cold storage

51-857

Accident analysis of a bridge pier slant in newbuilding Shengmu-Suozhou Railway Line.
Ji, L.S., Zhang, Z., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.403-407, In Chinese with English summary.
Railroads, Bridges, Piers, Frozen ground settling, Settlement (structural), Accidents, China—Shanxi Province

51-858

Thermal engineering model and the formulae of steady and quasi-static temperature field of pile-based structure in the seasonally frozen ground regions.
Li, N.S., Li, H.S., Liu, Z.L., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.408-412, In Chinese with English summary.
Pile structures, Piles, Soil freezing, Frozen ground thermodynamics, Heat transfer, Thermal analysis, Mathematical models

51-859

Calculation of displacement and stress distribution of frozen-wall using viscoelastic method.
Niu, Y.H., Zhang, C.Q., Zhang, J.M., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.413-418, In Chinese with English summary. 3 refs.
Shaft sinking, Artificial freezing, Soil freezing, Soil stabilization, Frozen ground thermodynamics, Frozen ground strength, Thermal stresses, Stress concentration, Mathematical models

51-860

Preliminary prediction of the freezing-thawing situation in rock surrounding the Dabanshan Tunnel.
He, C.X., Wu, Z.W., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.419-425, In Chinese with English summary. 3 refs.
Tunnels, Frozen ground thermodynamics, Frozen rock temperature, Frozen rock strength, Permafrost distribution, Permafrost forecasting, China—Qilian Mountains

51-861

Basic characteristics of slope hydrological processes in the permafrost area in the ice-free cirque at the headwaters of the Urumqi River, Tianshan Mountains.
Yang, Z.N., Woo, M.K., Liu, X.R., Wang, Q., Wang, J.Q., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.426-434, In Chinese with English summary. 9 refs.
Permafrost hydrology, Active layer, Cirques, Slope processes, Runoff forecasting, China—Tian Shan

51-862

Calculation on heat state of the petroleum pipelines with a separative insulation of flat plate in deep seasonal frozen ground region.
Gao, X.W., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.435-440, In Chinese with English summary. 3 refs.
Underground pipelines, Pipeline insulation, Frozen ground thermodynamics, Frost penetration, Heat transfer, Mathematical models, China

51-863

Method of calculation about the growth of ice sheet in Lingxi Prefecture, Hulun Buir League, Inner Mongolia Autonomous Region.
Ruan, G.S., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.441-446, In Chinese with English summary.
Ice surveys, River ice, Ice cover thickness, Ice growth, Ice heat flux, Ice forecasting, Mathematical models, China—Inner Mongolia

51-864

Simulation of snow melt runoff based on the energy-water balance at the high-mountain zone of the Tianshan Mountains.

Kang, E.S., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.447-454, In Chinese with English summary. 5 refs.

Snow hydrology, Snowmelt, Snow heat flux, Precipitation (meteorology), Water balance, Stream flow, Runoff forecasting, Mathematical models, China—Tian Shan

51-865

Influences of glacier fluctuation on glacier runoff in high Asia.

Xie, Z.C., Feng, Q.H., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.455-461, In Chinese with English summary. 8 refs.

Mountain glaciers, Glacier surveys, Glacier oscillation, Glacier mass balance, Glacial hydrology, Glacial meteorology, Meltwater, Runoff, Global warming, Mathematical models

51-866

Exploitation and utilization of glacial water and glacial mineral water in the Qilian Mountains.

Huang, Y.Z., Gao, Z.S., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.462-468, In Chinese with English summary.

Mountain glaciers, Glacial hydrology, Meltwater, Springs (water), Water reserves, Water supply, Water chemistry, Natural resources, China—Qilian Mountains

51-867

Characteristics of snow cover in Qinghai Province and its hydrological effects.

Cao, M.S., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.469-474, In Chinese with English summary. 5 refs.

Snow surveys, Snow cover distribution, Snowfall, Snow hydrology, Snowmelt, Runoff forecasting, Statistical analysis, China—Qinghai Province

51-868

Preliminary study on determining water supply sources of frost damages with water chemical method in northeast China.

Wang, C.H., Song, C.C., Liu, F.T., Zhang, B.L., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.475-480, In Chinese with English summary. 4 refs.

Road icing, Railroads, Frost action, Frost mounds, Ground water, Water chemistry, Hydrogeochemistry, Cost analysis, China

51-869

Climate change and runoff change and their interrelation in the Hexi Corridor, Gansu Province.

Ma, S.M., Qu, Y.G., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.481-487, In Chinese with English summary. 4 refs.

Precipitation (meteorology), Air temperature, Climatic changes, Global warming, Runoff, Stream flow, China—Qilian Mountains

51-870

Superiority of radial well applied in exploitation of water resources in cold regions.

Ning, Y.M., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.488-494, In Chinese with English summary.

Wells, Ground water, Water supply, Water reserves

51-871

Responses of glaciers and glacier runoff to climate change in the Tianshan Mountains.

Ye, B.S., Shi, Y.F., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.495-503, In Chinese with English summary. 14 refs.

Mountain glaciers, Glacier oscillation, Glacier mass balance, Glacial meteorology, Glacial hydrology, Meltwater, Runoff, Climatic changes, Mathematical models, China—Tian Shan

51-872

Snowmelt at the high Arctic, N.W.T., Canada.

Da, Q.Y., Woo, M.K., Zhao, J.X., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.504-514, 20 refs.

Snow hydrology, Snow air interface, Snow heat flux, Snowmelt, Canada—Northwest Territories—Resolute

51-873

Components and sources of ions within the streamwater and snowpack in an ice-free cirque at the headwaters of the Urumqi River, Tianshan Mountains.

Liu, F.J., Ye, B.S., Yang, D.Q., Williams, M.W., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.515-521, In Chinese with English summary. 6 refs.

Cirques, Snow composition, Snow hydrology, Snowmelt, Stream flow, Water chemistry, Hydrogeochemistry, Ion density (concentration), China—Tian Shan

51-874

Changing characteristics of runoff in a hydrological section at the headwaters of the Urumqi River.

Han, T.D., Yang, X.Y., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.522-526, In Chinese with English summary. 3 refs.

Mountain glaciers, Glacial meteorology, Glacier mass balance, Glacier ablation, Glacial hydrology, Meltwater, Runoff, China—Tian Shan

51-875

Water resource utilization and ecological environment protection in northwest arid regions of China.

Xing, D.W., Zhang, Y.F., Su, X.L., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.527-532, In Chinese with English summary. 8 refs.

Deserts, Steppes, Water reserves, Natural resources, Environmental protection, Regional planning, Economic development, China

51-876

Preliminary study on acidity and conductivity features of five kinds of water samples from Point Barrow, Alaska.

Hou, S.G., Qin, D.H., Zhang, Q.S., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.533-540, In Chinese with English summary. 9 refs.

Air pollution, Atmospheric composition, Precipitation (meteorology), Scavenging, Water pollution, Water chemistry, Electrical resistivity, United States—Alaska—Barrow

51-877

Discussion about some fundamental geocryological terminology.

Liu, H.X., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.541-544, In Chinese with English summary. 6 refs.

Soil freezing, Frozen ground, Ground thawing, Terminology

51-878

Progress in studying ice textures of ice cores in China.

Huang, M.H., Wang, W.T., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.547-555, In Chinese with English summary. 16 refs.

Mountain glaciers, Ice cores, Glacier ice, Ice structure, Ice crystal structure, Ice crystal size, China

51-879

Grain growth in laboratory prepared and field ice samples.

Li, J., Jacka, T.H., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.556-564, In Chinese with English summary. 12 refs.

Ice crystal growth, Ice crystal size, Ice crystal replicas, Ice temperature

51-880

On the measuring methods of physical and mechanical properties for fine granular ethanol model ice.

Li, Z.J., Riska, K., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.565-571, In Chinese with English summary. 6 refs.

Artificial ice, Ice strength, Environmental tests

51-881

Porosity effect on uniaxial compressive strength for sea ice in Liaodong Gulf.

Li, Z.J., Peng, W.W., Wu, Z.W., Zhang, T., Lu, M., Gao, S.G., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.572-578, In Chinese with English summary. 9 refs.

Ice cover strength, Ice loads, Ice pressure, Ice density, Ice salinity, Ice temperature, Ice deformation, Mathematical models, China—Liaodong Gulf

51-882

On the forecast model of horizontal uniaxial compressive strength of ice sheet in Liaodong Gulf.

Li, Z.J., Sui, J.X., Ding, D.W., Wu, Z.W., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.579-585, In Chinese with English summary. 14 refs.

Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice forecasting, Ice models, Mathematical models, China—Liaodong Gulf

51-883

CT scanning and calculation analysis of sea ice.

Pu, Y.B., Li, Z.J., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.586-590, In Chinese with English summary. 5 refs.

Sea ice, Ice sampling, Ice structure, Ice density, Ice salinity, X ray analysis, Computer applications

51-884

Study on internal dynamics of avalanches in west area of the Tianshan Mountains.

Qiu, J.Q., Xu, J.R., Jiang, F.Q., Abe, O., Sato, A., Nohguchi, Y., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.591-596, In Chinese with English summary.

Avalanche mechanics, Avalanche tracks, Snow loads, Impact tests, China—Tian Shan

51-885

Water and solute migration in saturated freezing saline soil with NaCl in an open system.

Xu, X.Z., Deng, Y.S., Wang, J.C., Wang, Y.J., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.597-600, In Chinese with English summary. 4 refs.

Saline soils, Loess, Soil freezing, Soil water migration, Frozen ground chemistry, Frozen ground thermodynamics

51-886

Water and solute migration in unsaturated freezing saline soil with NaCl in a close system.

Xu, X.Z., Deng, Y.S., Wang, J.C., Wang, Y.J., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.601-606, In Chinese with English summary. 6 refs.

Saline soils, Clay soils, Soil freezing, Soil water migration, Frozen ground chemistry, Frozen ground thermodynamics

51-887

Frost heave and salt expansion of freezing saline soils.

Xu, X.Z., Wang, J.C., Zhang, L.X., Deng, Y.S., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.607-618, In Chinese with English summary. 9 refs.

Saline soils, Soil freezing, Soil water migration, Frost heave, Frozen ground thermodynamics, Frozen ground chemistry, Mathematical models

51-888

Essential characteristics of frozen fringe and determination of its parameters.

Xu, X.Z., Wu, Z.W., Ishizaki, T., Fukuda, M., Chuvilin, E.M., Ershov, E.D., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.619-626, In Chinese with English summary. 3 refs.

Soil freezing, Freezing front, Soil water migration, Ice lenses, Frost heave, Frozen ground thermodynamics, Mathematical models

51-889

Influence of frost and thaw cycles on stability of lime soil beneath subgrade.

Xu, X.Z., et al, Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.627-631, In Chinese with English summary. 3 refs.

Subgrade soils, Soil stabilization, Liming, Soil strength, Frost action, Frost resistance, Freeze thaw tests

51-890

Diffusion behaviour of gold at the substrate-snow interface.

Fedoseeva, V.I., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.632-636, 12 refs.

Snow composition, Snow impurities, Snow permeability, Snow cover effect, Soil chemistry, Geochemistry, Gold

51-891

Study on micro structures of frozen soils.

Wang, J.C., Wang, Y.J., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.637-642, In Chinese with English summary. 5 refs.

Cryogenic soils, Soil structure, Microstructure, Frozen ground strength, Frozen ground compression, Soil creep

51-892

Study on mechanisms of erosion by frost and thaw cycles and winding of architecture made up of ancient immature soil in northwest China and its protection measures.

Wang, J.C., Qu, J.J., Wang, Y.J., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.643-648, In Chinese with English summary. 3 refs.

Frost action, Frost weathering, Wind erosion, Earthwork, Frost protection, Covering

51-893

On the ultimate pressure of frost heaving force for clayey soil.

Xu, S.X., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.649-653, In Chinese with English summary. 3 refs.

Clay soils, Soil freezing, Frost heave, Frozen ground compression, Frozen ground strength

51-894

Water migration in ice segregation process and surface melting of ice.

Chen, R.J., Horiguchi, K., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.654-658, In Chinese with English summary. 6 refs.

Soil freezing, Soil water migration, Ice lenses, Ice surface, Ice melting, Regelation

51-895

Evaluating the ionic permeability in frozen soils and ice.

Chuvilin, E.M., Smirnova, O.G., Kochetkova, N.IU., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.659-665, 10 refs.

Soil pollution, Frozen ground chemistry, Hydrogeochemistry, Ice composition, Impurities, Ion diffusion, Permeability

51-896

Characteristics of water retention curves of saline soil.

Deng, Y.S., Xu, X.Z., Zhang, L.X., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.666-670, In Chinese with English summary.

Saline soils, Soil chemistry, Soil water migration, Water content, Water retention

51-897

Relationship between frozen depth and water content of soil in Daqing region.

Chen, Y.C., Jiang, H.J., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.671-674, In Chinese with English summary. 2 refs.

Soil freezing, Soil water migration, Unfrozen water content, Frozen ground thermodynamics, Frost penetration, China—Heilongjiang Province

51-898

Study of the variability of the soil conductivity through the factors influencing it.

Wang, G.S., Tao, Z.X., Jin, H.J., Lin, Q., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.675-683, In Chinese with English summary. 32 refs.

Soil freezing, Ground thawing, Frozen ground thermodynamics, Soil water migration, Unfrozen water content, Heat transfer, Thermal conductivity

51-899

Thermal conductivity and measuring technology of thermal insulation construction materials.

Tao, Z.X., Gu, T.X., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.684-688, In Chinese with English summary. 1 ref.

Thermal insulation, Frost protection, Construction materials, Cold weather tests, Thermal conductivity

51-900

Preliminary study of the thermal conductivity of magnesium oxide and its mixture.

Tao, Z.X., Xu, X.Z., Gu, T.X., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.689-692, In Chinese with English summary. 1 ref.

Soil freezing, Soil stabilization, Frost protection, Antifreezes, Unfrozen water content, Thermal conductivity

51-901

Unfrozen water content of sodium sulfate soil.

Zhang, L.X., Xu, X.Z., Tao, Z.X., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.693-696, In Chinese with English summary. 3 refs.

Saline soils, Loess, Soil freezing, Frozen ground thermodynamics, Unfrozen water content, Moisture detection, Nuclear magnetic resonance

51-902

Physics, porousness and frost heave behavior of lime clay.

Zhang, L.X., Xu, X.Z., Wang, J.C., Deng, Y.S., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.697-701, In Chinese with English summary. 5 refs.

Clay soils, Soil freezing, Frost heave, Soil stabilization, Frost protection, Liming

51-903

Study on the consolidation of unfrozen fine-grained soil during freezing period by numerical method.

Zhou, G.Q., Yang, W.H., Chen, X.D., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.702-706, In Chinese with English summary. 10 refs.

Soil freezing, Freezing front, Frozen ground thermodynamics, Frozen ground strength, Mathematical models

51-904

Dynamic elastic modulus and critical dynamic stress of frozen soil under cyclic loading.

Xu, X.Y., et al, Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.707-711, In Chinese with English summary. 4 refs.

Frozen ground strength, Frozen ground compression, Soil creep, Soil tests, Strain tests, Stress strain diagrams

51-905

Experimental study on micromechanism of strength of frozen medium sand.

Ma, W., Wu, Z.W., Chang, X.X., Wang, J.C., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.712-718, In Chinese with English summary. 7 refs.

Sands, Frozen ground strength, Frozen ground compression, Soil creep, Soil structure, Microstructure, Strain tests

51-906

Torsional strength of frozen soil and factors influencing it.

Xian, C.D., He, P., Zhu, Y.L., Chang, X.X., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.719-723, In Chinese with English summary. 5 refs.

Frozen ground strength, Frozen ground compression, Soil creep, Soil tests, Strain tests, Stress strain diagrams

51-907

Research on long-term strength of frozen soil under changing stress.

Sheng, Y., Wu, Z.W., Miao, L.N., Ma, W., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.724-728, In Chinese with English summary. 4 refs.

Frozen ground strength, Frozen ground compression, Soil creep, Stress strain diagrams

51-908

Preliminary study on the creep of frozen soil under a sine vibrating temperature.

Sheng, Y., Wu, Z.W., Chang, X.X., Ma, W., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.729-732, In Chinese with English summary. 4 refs.

Frozen ground strength, Frozen ground compression, Frozen ground thermodynamics, Soil creep, Strain tests, Stress strain diagrams

51-909

Analysis on shear strain of frozen soil during twisting.

He, P., Zhu, Y.L., Zhang, J.M., Yu, Q.H., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.733-735, In Chinese with English summary. 1 ref.

Frozen ground strength, Soil tests, Strain tests, Stress concentration, Shear strain

51-910

Fracture toughness test methods and fracture mechanics behavior of frozen soil.

Li, H.S., Zhang, X.P., Liu, Z.L., Zhu, Y.L., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.736-740, In Chinese with English summary. 5 refs.

Frozen ground strength, Frozen ground compression, Soil creep, Soil tests, Strain tests, Cracking (fracturing)

51-911

Characteristics of the failure factors and the pattern of uniaxial dynamic strength for the frozen soil under a cyclic loading.

Shen, Z.Y., Zhang, J.Y., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.741-746, In Chinese with English summary. 7 refs.

Frozen ground strength, Frozen ground compression, Soil creep, Soil tests, Strain tests, Dynamic loads, Mathematical models

51-912

Perpendicularly anisotropic properties of frozen soil.

Zhang, C.Q., Zhang, J.M., Peng, W.W., Yu, Z.Q., Sha, J.D., Jiang, Y.J., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.747-750, In Chinese with English summary. 8 refs.

Frozen ground strength, Frozen ground compression, Soil creep, Soil tests, Strain tests

51-913

Micro-damage mechanical behaviours in frozen soil and their computer simulation.

Guo, L., Zhang, C.Q., Li, Y.F., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.751-755, In Chinese with English summary. 9 refs.

Frozen ground strength, Soil structure, Microstructure, Soil creep, Computerized simulation

51-914

Effect of sample size on test results in impact test of frozen soil.

Yu, Q.H., Zhu, Y.L., Zhang, J.M., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.756-760, In Chinese with English summary. 6 refs.

Frozen ground strength, Soil tests, Impact tests, Stress concentration, Cracking (fracturing)

51-915

Preliminary analysis of parameters of drilling and cutting frozen soil.

Ma, Q.Y., Chen, Q.F., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.761-764, In Chinese with English summary. 2 refs.

Frozen ground strength, Rotary drilling, Shaft sinking

51-916

Triaxial strength of frozen consolidation clay.

Shen, Z.Y., Wu, Z.W., Zhang, J.Y., Chang, X.X., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.765-770, In Chinese with English summary. 4 refs.

Clay soils, Frozen ground strength, Frozen ground compression, Frozen ground temperature, Soil tests, Strain tests

51-917

Discussion on strength characteristics of consolidated dilative clayey soil at low temperature.

Peng, W.W., Wu, Z.W., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.771-774, In Chinese with English summary. 9 refs.

Clay soils, Frozen ground strength, Frozen ground compression, Frozen ground thermodynamics

51-918

New method for clamping samples in tension test of frozen soil.

Peng, W.W., Zhang, J.M., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.775-778, In Chinese with English summary. 7 refs.

Frozen ground strength, Soil tests, Strain tests, Strain measuring instruments, Tensile properties

51-919

Elastic modulus of frozen soil under triaxial stress condition.

Chang, X.X., Ma, W., Wu, Z.W., He, P., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.779-782, In Chinese with English summary. 7 refs.

Frozen ground strength, Frozen ground compression, Soil creep, Soil tests, Strain tests

51-920

Tanggula ice core dated by laser-light scanning method.

Sun, B., Yao, T.D., Xie, Z.C., Guo, X.M., Pu, J.C., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.783-788, In Chinese with English summary. 9 refs.

Mountain glaciers, Ice cores, Ice composition, Ice optics, Ice dating, Dust, Lasers, China—Qinghai-Xizang Plateau

51-921

Experimental study on adfreezing strength of model piles in frozen loess under dynamic loading.

Zhang, J.M., Zhu, Y.L., Zhang, J.Y., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.789-793, In Chinese with English summary. 8 refs.

Loess, Frozen ground strength, Soil freezing, Soil pressure, Ice adhesion, Pile load tests

51-922

About measurement of frozen soil by needle probe method.

Zhang, J.S., Fu, R., Fukuda, M., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.794-798, In Chinese with English summary. 4 refs.

Soil freezing, Frozen ground thermodynamics, Thermal conductivity, Temperature measurement, Soil water migration, Moisture meters, Probes, Statistical analysis

51-923

Method for determining cubical change in triaxial tests.

Zhu, G.C., Chang, X.X., Zhu, Y.L., Yang, S.G., Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.799-803, In Chinese with English summary.

Frozen ground strength, Frozen ground compression, Soil creep, Soil tests, Strain tests

51-924

Viability and bioluminescence of freeze-dried cells of marine bacteria during storage.

Vipiñach, A.N., Markelova, S.I., *Moscow University. Biological sciences bulletin,* 1995, 50(3), p.27-31, Translated from Moscow. Universitet. Vestnik: Biologiia. 9 refs.

Marine biology, Microbiology, Bacteria, Sampling, Preserving, Cold storage, Viability, Luminescence, Freeze drying

51-925

Latitudinal and meridional regularities in distribution of phytomass reserves, organic matter in soil, and primary production of terrestrial ecosystems in the north of Russia from the Kola Peninsula to the Chukot Peninsula.

Chestnikh, O.V., Karelin, D.V., Zamolodchikov, D.G., *Moscow University. Biological sciences bulletin,* 1995, 50(3), p.42-46, Translated from Moscow. Universitet. Vestnik: Biologiia. 7 refs.

Ecosystems, Biomass, Subpolar regions, Organic soils, Soil composition, Tundra soils, Distribution, Statistical analysis, Russia—Chukotskiy Peninsula, Russia—Kola Peninsula

51-926

Frequency dependence of the effective bottom sound absorption in the Barents Sea.

Grigor'ev, V.A., Katsnel'son, B.G., Petnikov, V.G., *Acoustical physics,* Sep.-Oct. 1996, 42(5), p.627-629, Translated from Akusticheskiĭ zhurnal. 3 refs.

Oceanography, Underwater acoustics, Ocean bottom, Bottom sediment, Sound waves, Attenuation, Low frequencies, Velocity measurement, Profiles, Spectra, Statistical analysis, Barents Sea

51-927

Modeling the mean circulation of the Labrador Sea and the adjacent shelves.

Tang, C.C.L., Gui, Q.C., Peterson, I.K., *Journal of physical oceanography,* Oct. 1996, 26(10), p.1989-2010, 34 refs.

Oceanography, Ocean currents, Water transport, Atmospheric boundary layer, Ice floes, Drift, Telemetering equipment, Velocity measurement, Buoyancy, Wind factors, Mathematical models, Seasonal variations, Labrador Sea

51-928

Initialization, asymmetry, and spindown of arctic eddies.

Chao, S.Y., Shaw, P.T., *Journal of physical oceanography,* Oct. 1996, 26(10), p.2076-2092, 30 refs.

Oceanography, Ocean currents, Ice water interface, Ice friction, Ice cover effect, Turbulent diffusion, Salinity, Fluid dynamics, Mathematical models

51-929

Topographic preconditions of open-ocean deep convection.

Alverson, K., Owens, W.B., *Journal of physical oceanography,* Oct. 1996, 26(10), p.2196-2213, 25 refs.

Oceanography, Ocean currents, Convection, Stratification, Profiles, Bottom topography, Topographic effects, Mathematical models

Evidence for oceanic convection over Maud Rise in the Weddell Sea suggests that bottom topography may select the location and scale of deep convecting oceanic chimneys forced by seasonal large-scale atmospheric cooling. In this paper, the role of bottom topography in open-ocean deep convection is studied using an idealized three-dimensional primitive equation model. A barotropic mean flow impinges on a Gaussian-shaped seamount in a stratified domain generating a Taylor cap (a region of topographically trapped fluid). Convection within this region is significantly enhanced relative to ambient levels away from the seamount and to similar numerical simulations performed without bottom topography. An analytic formula for one-dimensional nonpenetrative convection into an exponential stratification profile is derived and compares well with results from the numerical model. Parameter dependencies for these topographic preconditioning mechanisms are discussed. These numerical results suggest that bottom topography can play an important role in selecting the location and horizontal scale of deep convection in the ocean. (Auth. mod.)

51-930

On the obscurantist physics of "form drag" in theorizing about the Circumpolar Current.

Warren, B.A., LaCasce, J.H., Robbins, P.E., *Journal of physical oceanography,* Oct. 1996, 26(10), p.2297-2301, 30 refs.

Oceanography, Ocean currents, Air water interactions, Wind factors, Fluid dynamics, Water transport, Stress concentration, Mathematical models

The authors point out that, since the "form-drag" force balance commonly advanced for the Antarctic Circumpolar Current is really just a statement that northward Ekman transport in the circumpolar Drake Passage zone is compensated by deep southward geostrophic flow, the balance is actually irrelevant to the magnitude of the current itself. It is thus misleading to ascribe a role to form drag in its physics. Sverdrup dynamics seems to offer a more promising analysis of the real Circumpolar Current—as proposed long ago. (Auth.)

51-931

Hydrological modelling of snowmelt in the Italian Alps using visible and infrared remote sensing.

Swamy, A.N., Brivio, P.A., *International journal of remote sensing,* Nov. 10, 1996, 17(16), p.3169-3188, Refs. p.3186-3188.

Spaceborne photography, Alpine landscapes, River basins, Snow surveys, Snow hydrology, Sensor mapping, Snow cover distribution, Snowmelt, Radiometry, Runoff forecasting, Water supply, LANDSAT, Statistical analysis, Italy—Alps

51-932

Clathrate hydrate of formaldehyde.

Ripmeester, J.A., Ding, L., Klug, D.D., *Journal of physical chemistry,* Aug. 8, 1996, 100(32), p.13,330-13,332, 30 refs.

Ice physics, Extraterrestrial ice, Hydrates, Clathrates, Phase transformations, Molecular energy levels, Ice formation, Amorphous ice, X ray diffraction, Spectra, Low temperature tests, Simulation

51-933

Acceleration mechanism of chemical reaction by freezing: the reaction of nitrous acid with dissolved oxygen.

Takenaka, N., Ueda, A., Daimon, T., Bandow, H., Dohmaru, T., Maeda, Y., *Journal of physical chemistry,* Aug. 8, 1996, 100(32), p.13,874-13,884, 40 refs.

Solutions, Ice physics, Frozen liquids, Freezing, Chemical properties, Ice crystal growth, Ice water interface, Liquid phases, Ion diffusion, Freezing rate, Condensation

51-934

Isomeric differences in the nucleation of crystalline hydrocarbons from their melts.

Huang, J.F., Lu, W.Q., Bartell, L.S., *Journal of physical chemistry,* Aug 22, 1996, 100(34), p.14,276-14,280, 26 refs.

Hydrocarbons, Cryogenics, Frozen liquids, Drops (liquids), Homogeneous nucleation, X ray diffraction, Molecular structure, Thermodynamic properties, Spectra, Nucleation rate

51-935

Symbiotic N_2-fixation in alpine tundra: ecosystem input and variation in fixation rates among communities.

Bowman, W.D., Schardt, J.C., Schmidt, S.K., *Oecologia,* Oct. 11, 1996, 108(2), p.345-350, 54 refs.

Tundra vegetation, Alpine tundra, Ecosystems, Tundra soils, Soil microbiology, Meadow soils, Plant ecology, Nutrient cycle, Plant tissues, Isotope analysis, Geochemical cycles

51-936

Deglacial land emergence and lateral upper-mantle heterogeneity in the Svalbard Archipelago. II. Extended results for high-resolution load models.

Kaufmann, G., Wolf, D., *Geophysical journal international,* Oct. 1996, 127(1), p.125-140, 57 refs.

Marine geology, Pleistocene, Glacial geology, Tectonics, Ice sheets, Ice cover thickness, Ice loads, Ice melting, Ice cover effect, Isostasy, Viscoelasticity, Models, Norway—Svalbard

51-937

Convection in the Greenland Sea, 1982-1993.

Rhein, M., *Journal of geophysical research,* Aug. 15, 1996, 101(C8), p.18,183-18,192, 32 refs.

Oceanography, Ocean currents, Seasonal variations, Convection, Advection, Profiles, Turbulent diffusion, Hydrography, Simulation, Oceanographic surveys, Greenland Sea

51-938

On the representation of sea ice in global ocean general circulation models.

Stössel, A., Oberhuber, J.M., Maier-Reimer, E., *Journal of geophysical research,* Aug. 15, 1996, 101(C8), p.18,193-18,212, 70 refs.

Oceanography, Climatology, Atmospheric boundary layer, Air ice water interaction, Sea ice distribution, Ice cover thickness, Ice heat flux, Ice growth, Ice cover effect, Mathematical models, Ice models, Thermodynamics

The performance of the sea ice component of two ocean general circulation models (OGCMs) is investigated under quasi-identical forcing and boundary conditions and compared with the performance of a stand-alone sea ice model. The latter reproduced realistic sea ice characteristics under the same external conditions. All three sea ice models employ a viscous-plastic constitutive law to describe the variation in internal ice stress in the momentum balance. The treatment of the sea ice component in global OGCMs is discussed in a more general context, focusing on the southern ocean, where sea ice plays a critical role in bottom water formation. These studies show that sea ice in present-day global OGCMs can be formulated with the same quality as stand-alone sea ice models designed for specific regional studies, without the sacrifice of notable extra computation time. (Auth. mod.)

51-939

Development of the Odden ice tongue in the Greenland Sea during winter 1993 from remote sensing and field observations.

Wadhams, P., et al, *Journal of geophysical research,* Aug. 15, 1996, 101(C8), p.18,213-18,235, 30 refs.

Oceanographic surveys, Sea ice distribution, Ice edge, Frazil ice, Young ice, Physical properties, Ice growth, Air ice water interaction, Spaceborne photography, Synthetic aperture radar, Sampling, Correlation, Ice deterioration, Greenland Sea

51-940

Near-surface circulation of the Nordic seas as measured by Lagrangian drifters.

Poulain, P.M., Warn-Varnas, A., Niiler, P.P., *Journal of geophysical research,* Aug. 15, 1996, 101(C8), p.18,237-18,258, 45 refs.

Oceanography, Ocean currents, Sounding, Telemetering equipment, Drift, Hydrography, Velocity measurement, Statistical analysis, Greenland Sea, Norwegian Sea

51-941

Nested primitive equation model of the Iceland-Faeroe front.

Fox, A.D., Maskell, S.J., *Journal of geophysical research,* Aug. 15, 1996, 101(C8), p.18,259-18,278, 25 refs.

Oceanography, Subpolar regions, Ocean currents, Mathematical models, Bottom topography, Hydrography, Buoyancy, Boundary layer, Heat flux, Statistical analysis, Forecasting, Norwegian Sea

51-942

Weddell Sea ice drift: kinematics and wind forcing.

Vihma, T., Launiainen, J., Uotila, J., *Journal of geophysical research,* Aug. 15, 1996, 101(C8), p.18,279-18,296, 42 refs.

Oceanography, Ocean currents, Sea ice distribution, Drift, Sounding, Ice air interface, Turbulent boundary layer, Velocity measurement, Wind direction, Seasonal variations, Statistical analysis, Spectra, Antarctica—Weddell Sea

Ice drift in the Weddell Sea was studied on the basis of positional and meteorological data from Argos buoys drifting in 1990-1992 and surface pressure analyses from the European Centre for Medium Range Weather Forecasts (ECMWF). The drift kinematics showed differences between the eastern and western parts of the Weddell Sea. Close to the Antarctic Peninsula, the ice drifted as an almost nonrotating uniform field at a low speed, having reduced small-scale motions with little meandering, compared to regions further to the east. Inertial motion was detected from the ice drift in areas east of 35°W and in the region of the Antarctic Circumpolar Current. The data suggest a dependency upon atmospheric stability such that stable stratification reduces the wind forcing on the drift. Ice transport through a transect crossing the Weddell Sea from the Antarctic Peninsula tip to Kapp Norwegia was estimated on the basis of the geostrophic winds, the drift's observed response to the wind, and literature-based information on ice concentration and thickness. The estimated annual mean net export in 1992-94 varied from 8,000 to 22,000 m^3/s. Most of the net export took place in winter and spring. (Auth. mod.)

51-943

Cosmonaut polynya in the southern ocean: structure and variability.

Comiso, J.C., Gordon, A.L., *Journal of geophysical research,* Aug. 15, 1996, 101(C8), p.18,297-18,313, 40 refs.

Oceanography, Sea ice distribution, Ice water interface, Ocean currents, Upwelling, Polynyas, Pack ice, Ice melting, Hydrography, Seasonal variations, Statistical analysis

Along the far eastern margin of the Weddell Gyre is a persistent feature in the middle of the ice pack called the Cosmonaut polynya. A study of polynya occurrences from 1973 to 1993 reveals that since 1986 the polynya has become more active with an average size of about 7.2×10^4 km^2 and an average location at 52°E and 65°S. Satellite observations indicate that the polynya has recurred several times during winter in recent years with intervals ranging from a few days to a few weeks. The daily time series indicates two primary modes of formation: one that is initiated in the early winter during a storm at a site usually preceded by an embayment of the ice edge and another that occurs during midwinter often preceded by a coastal polynya event adjacent to Cape Ann. The Cosmonaut polynya region is characterized in this study by compression of the westward flowing coastal current and the eastward flowing southern edge of the Antarctic Circumpolar Current. Vertical stretching of the water column, enhancing upwelling, accelerates the injection of relatively warm salty deep water into the surface layer, inhibiting sea ice growth and causing the polynya formation. This theory appears to explain the general behavior of the polynya in terms of frequency, duration, size, and location. (Auth. mod.)

51-944

Carbon budget of sea-ice algae in spring: evidence of a significant transfer to zooplankton grazers.

Michel, C., Legendre, L., Ingram, R.G., Gosselin, M., Levasseur, M., *Journal of geophysical research,* Aug. 15, 1996, 101(C8), p.18,345-18,360, Refs. p.18,357-18,360.

Marine biology, Plankton, Algae, Biomass, Suspended sediments, Degradation, Ice bottom surface, Ice water interface, Ecosystems, Nutrient cycle, Sampling, Canada—Northwest Territories—Resolute Passage

51-945

Temporal and spatial patterns in the Ross Sea: phytoplankton biomass, elemental composition, productivity and growth rates.

Smith, W.O., Jr., Nelson, D.M., DiTullio, G.R., Leventer, A.R., *Journal of geophysical research,* Aug. 15, 1996, 101(C8), p.18,455-18,465, Refs. p.18,463-18,465.

Marine biology, Biomass, Plankton, Ecosystems, Distribution, Sampling, Geochemistry, Suspended sediments, Nutrient cycle, Seasonal variations, Antarctica—Ross Sea

The temporal and spatial patterns of phytoplankton biomass, productivity, and particulate matter composition in the Ross Sea were assessed during cruises in Jan. 1990 and Feb. 1992. Biomass and primary productivity in the southern Ross Sea were greatest during mid-Jan. A distinct south-north transition also was observed both in productivity and phytoplankton biomass, with the lowest values occurring in the northern Ross Sea. East-west gradients in phytoplankton biomass and composition occurred within the southern Ross Sea. The areal productivity of the Ross Sea is among the highest found in the entire Antarctic. Marked seasonality in the region provides an environment in which net growth rates, although slow, are maximized through low loss rates and which allows biomass to accumulate in the surface layer. Furthermore, the temporal variations are quantitatively similar to the observed spatial variations. Therefore the dominant determinant of phytoplankton biomass and productivity at any one point on the Ross Sea continental shelf is the stage of the seasonal growth cycle. (Auth. mod.)

51-946

Spatial patterns in phytoplankton biomass and pigment distributions in the Ross Sea.

DiTullio, G.R., Smith, W.O., Jr., *Journal of geophysical research,* Aug. 15, 1996, 101(C8), p.18,467-18,477, 57 refs.

Marine biology, Plankton, Biomass, Distribution, Ecosystems, Nutrient cycle, Geochemical cycles, Suspended sediments, Degradation, Chlorophylls, Sampling, Antarctica—Ross Sea

The distribution of phytoplankton biomass and pigments was determined in the Ross Sea during late austral summer 1992. Large gradients in biomass were noted both in the east-west and north-south direction, with maximum particulate matter concentrations occurring in the southwest portion of the Ross Sea. Two xanthophyll pigments dominated the profiles. Diatom-dominated regions had greater fluxes of phaeophorbides, suggesting that metazoans were the most important grazers at these locations. In contrast, the phaeophytin/total phaeopigment ratio was highest in waters dominated by *Phaeocystis antarctica*. The distribution of phytoplankton biomass and pigments revealed a spatially variable distribution of taxa, one which clearly has important consequences to food-web dynamics, biogeochemical cycles, and vertical flux patterns in the Ross Sea. (Auth. mod.)

51-947

Lateral transport of settling particles in the Ross Sea and implications for the fate of biogenic material.

Jaeger, J.M., Nittrouer, C.A., DeMaster, D.J., Kelchner, C., Dunbar, R.B., *Journal of geophysical research,* Aug. 15, 1996, 101(C8), p.18,479-18,488, 24 refs.

Oceanography, Ocean currents, Sedimentation, Organic nuclei, Suspended sediments, Sediment transport, Geochemical cycles, Sampling, Moorings, Antarctica—Ross Sea

The Ross Sea with its high rates of primary productivity and biogenic accumulation, provides an important location to test the validity of a one-dimensional particle-settling model. As part of an interdisciplinary field project performed from 1990 to 1992 to examine cycling and accumulation of biogenic matter in the Ross Sea, water-column particulate and current data were collected at three sites. At each site, a current meter and sediment trap were placed 240 m below the water surface, and at 40 m above the seabed. The moorings were deployed for 1- to 2-years duration. The current-meter records showed that the speed of flow in the southwestern Ross Sea is relatively slow and current direction is highly variable. Currents in the south-central Ross Sea have moderate speeds and less directional variability. The northwestern Ross Sea has the strongest flows and least variability in direction. Two models were developed to determine the net displacement of particles settling through the water column. One model evaluated vertical particle advection and the second estimated lateral particle advection. The pattern in displacement trends correlates well with observed sediment types and accumulation rates at each site. A one-dimensional model for the settling of biogenic material is most applicable at the southwestern site and least applicable at the northwestern site. (Auth. mod.)

51-948

Factors influencing the distribution of diatoms and other algae in the Ross Sea.

Leventer, A.R., Dunbar, R.B., *Journal of geophysical research,* Aug. 15, 1996, 101(C8), p.18,489-18,500, 63 refs.

Oceanography, Marine biology, Algae, Biomass, Distribution, Ice melting, Sedimentation, Turbulent diffusion, Ice water interface, Ice cover effect, Sampling, Geochemical cycles, Antarctica—Ross Sea

Quantitative microscopic analyses of sediment trap samples collected in the Ross Sea between Jan. 1990 and Feb. 1992 reveal striking temporal and spatial differences in algal bloom composition and size. Trap samples from the southwestern Ross Sea were dominated by the diatom *Fragilariopsis curta* (maximum of 92%), a species associated with both sea ice and the retreating ice edge in the Ross Sea. This species was probably seeded by melting congelation ice. Highest flux of diatom valves to both upper and lower traps in the 1991-92 season occurred as a distinct event in mid-Feb. 1991, after which flux decreased by 1 to 3 orders of magnitude. Distinct differences in bloom size and composition between sites may be a function of upper water column structure, differences in the amount of sea ice melting, and the type of sea ice present at the time of ice breakout (congelation versus pack ice). Significantly, spatial differences in diatom assemblages noted above appear to be reflected in seafloor surface sediments, suggesting that downcore diatom data provide an interpretable record of paleoproductivity in the Ross Sea. (Auth. mod.)

51-949

Preservation efficiencies and accumulation rates for biogenic silica and organic C, N, and P in high-latitude sediments: the Ross Sea.

DeMaster, D.J., Ragueneau, O., Nittrouer, C.A., *Journal of geophysical research,* Aug. 15, 1996, 101(C8), p.18,501-18,518, Refs. p.18,516-18,518.

Oceanography, Sedimentation, Bottom sediment, Turbulent diffusion, Drill core analysis, Geochemical cycles, Organic nuclei, Sampling, Geochronology, Correlation, Carbon isotopes, Antarctica—Ross Sea

Rates of biogenic sediment accumulation (biogenic silica and organic C, N, and P) and pore water flux have been established for a variety of depositional environments in the Ross Sea. On the basis of ^{14}C measurements in kasten cores, sediment accumulation rates ranged from 250 cm/kyr in the coastal basin of Granite Harbor to 1-2 cm/kyr in the shelf and slope environments of the northern and eastern Ross Sea. The preferential preservation of biogenic silica rela-

tive to organic carbon was apparent in Ross Sea sediments because the biogenic silica/organic carbon ratio in the material buried in the seabed generally was 2 times greater than the ratio in sediment particles arriving at the sediment-water interface. The total amount of biogenic silica accumulating on the Ross Sea shelf is approximately an order of magnitude less than the Ledford- Hoffman et al. [1986] estimate that was based on ^{210}Pb chronologies. Biogenic silica accumulation rates in the southern, central, and western Ross Sea increased during the mid and late Holocene, reaching their maximum values during the past 500 to 1000 years. (Auth. mod.)

51-950

Cycling of organic carbon and biogenic silica in the southern ocean: estimates of water column and sedimentary fluxes on the Ross Sea continental shelf.

Nelson, D.M., DeMaster, D.J., Dunbar, R.B., Smith, W.O., Jr., *Journal of geophysical research,* Aug. 15, 1996, 101(C8), p.18,519-18,532, Refs. p.18,530-18,532.

Oceanography, Biomass, Suspended sediments, Geochemical cycles, Sedimentation, Bottom sediment, Organic nuclei, Turbulent diffusion, Seasonal variations, Sampling, Antarctica—Ross Sea

The authors examined the cycling of organic carbon and biogenic silica in the water column and upper sediments of the Ross Sea, seeking to understand the processes leading to the formation of opal-rich, organic-poor sediments over much of the southern ocean. Between Jan., 1990 and Dec., 1994 three cruises were conducted to measure rates of primary production, nitrate-based "new" production, biogenic silica production and biogenic silica dissolution in the upper 50 m over most of the Ross Sea shelf in spring, mid summer and late summer. They deployed sediment traps from Jan., 1990 to early Mar., 1992 to measure the mid-water (250 m) and near-bottom gravitational fluxes of particulate organic carbon, nitrogen and biogenic silica year-round at three sites, and obtained sediment cores at 15 sites to assess the accumulation rates of organic carbon and biogenic silica in all known sediment regimes on the shelf. These data permit estimates of the annual production, near-surface recycling, vertical sinking flux, delivery to the seabed, benthic regeneration and long-term burial of both organic and siliceous material integrated over 75-80% of the Ross Sea shelf. The resulting annual budgets for carbon and silica indicate highly selective preservation of biogenic silica over organic carbon between 50 and 250 m in the water column, as well as in the upper seabed. Both silica preservation and the decoupling between the cycles of silica and carbon must be even more effective in the waters overlying abyssal southern ocean sediments than they are over the Ross Sea shelf. (Auth. mod.)

51-951

Classification of radar satellite data for sea ice identification by means of line scanner measurements. [Klassifikation von Radarsatellitendaten zur Meereiserkennung mit Hilfe von Line-Scanner-Messungen]

Bochert, A., *Berichte zur Polarforschung,* 1996, No.209, 202p., In German with English summary. Includes a sea ice glossary in German, p.199-202. 102 refs.

Sea ice distribution, Remote sensing, Measuring instruments, Synthetic aperture radar, Sensor mapping, Infrared mapping, North Atlantic Ocean

51-952

Influence of the atmosphere on the remote sensing of sea ice using passive microwave radiometers. [Atmosphäreneinfluß bei der Fernerkundung von Meereis mit passiven Mikrowellenradiometern]

Oelke, C., *Berichte zur Polarforschung,* 1996, No.208, 117p., In German with English summary. 76 refs.

Cloud cover, Water vapor, Sea ice distribution, Models, Measuring instruments, Antarctica—Weddell Sea

Significant errors in estimating short-time variations and climatological concentration trends occur due to clouds and water vapor. For the assessment of these weather effects on sea ice concentration, the atmospheric parameters integrated water vapor content (W) and cloud liquid water path (LWP) are derived from radiosonde ascents measured over Weddell Sea ice in 1992. Using a microwave radiative transfer model and typical surface emissivities, brightness temperatures are calculated from the radiosonde ascents. The first-year, multiyear and total sea-ice concentrations are calculated using the NASA team sea-ice algorithm for the SSM/I radiometer. The results of the model study indicate that the presence of cloud liquid water increases estimates of total sea-ice concentration by the same magnitude as the presence of water vapor, i.e. up to +10%, depending on surface type (open ocean, first-year ice, multiyear ice). Estimates of the multiyear ice concentration are reduced by up to 80% by cloud liquid water whereas the water-vapor effect is smaller (up to -6%). The combined effect of LWP and W is less than the algebraic sum of the two. The importance of using realistic measurements of atmospheric conditions in the polar sea-ice area is investigated in detail for different vertical water-vapor profiles and various cloud bases and cloud heights. (Auth. mod.)

51-953

Freeze frame.

Hallett, J., *Sciences,* Nov./Dec. 1996, 36(6), p.22-26.

Ice physics, Ice crystal structure, Dendritic ice, Clouds (meteorology)

51-954

Mantle viscosity and ice-age ice sheet topography.

Peltier, W.R., *Science,* Sep. 6, 1996, 273(5280), p.1359-1364, 51 refs.

Ice sheets, Topographic features, Pleistocene, Glacial geology, Isostasy, Models, United States

51-955

Global operational monitoring of atmospheric ozone from space.

Kot, A.I., Liudchik, A.M., Krasovskiĭ, A.N., Cherniavskiĭ, A.F., *Soviet journal of remote sensing,* 1992, 10(1), p.109-120, Translated from Issledovanie Zemli iz Kosmosa. 12 refs.

DLC G70.4.I882 1992

Ozone, Ultraviolet radiation, Seasonal variations, Polar stratospheric clouds, Models, Remote sensing, Antarctica—South Pole

The paper describes the use of satellite observations of the distribution pattern of atmospheric radiant intensities in the UV area for operational monitoring of the state of the ozone layer. The effectiveness of the method is illustrated by model calculations. Detailed information about the state of the ozone layer over Antarctica has been obtained using devices on board Nimbus 7. It is suggested that one significant addition to existing methods would be the possibility of constant global monitoring of the whole south polar zone from a satellite in a very high polar orbit, to measure the distribution of the intensity of the UV brightness of the atmosphere. (Auth. mod.)

51-956

East Antarctic Ice Sheet development, global carbon cycling and deep water evolution in the southwest Pacific during the middle Miocene climatic transition from 16 to 12 Ma.

Flower, B.P., Santa Barbara, University of California, 1993, 248p., University Microfilms order No.94-19071, Ph.D. thesis. Refs. p.189-193.

Ice sheets, Ice formation, Ice volume, Paleoclimatology, Climatic changes, Oceanography, Polar atmospheres, Paleoecology, Antarctica—East Antarctica

The Middle Miocene represents a major change in state in Cenozoic antarctic climatic evolution, following the climax of Neogene warmth in the Late-Early Miocene at 16 Ma. The early stage of this climatic transition from 16 to 14.8 Ma was marked by major variations in global climates, East Antarctic Ice Sheet volume, sea level, and deep ocean circulation. Antarctic climate change was also associated with important changes in global carbon cycling and in the terrestrial biosphere. Increased aridification of mid-latitude continental regions enhanced the development of grasslands and stimulated the evolution of grazing mammals in the Early Middle Miocene. Deep ocean circulation changes probably played a major role in the evolution and variation in polar climates. Invigoration of Southern Component Water production was closely linked to antarctic cooling and major growth of the East Antarctic Ice Sheet after 14.8 Ma, representing a crucial step in the establishment of late Neogene global climate systems. (Auth. mod.)

51-957

Development and operation of a photovoltaic power system for use at remote Antarctic sites.

Piszczor, M.F., Kohout, L.L., Manzo, M., Colozza, A.J., 1994 IEEE First World Conference on Photovoltaic Energy Conversion. Conference Record of the 24th IEEE Photovoltaic Specialists Conference-1994. Vol.1, New York, IEEE, 1994, p.1145-1148, 1 ref.

DLC TK2960.P48a 1994

Electric power, Electric equipment, Low temperature research, Batteries, Solar radiation, Antarctica—Hoare, Lake

A photovoltaic power system, designed and built at the NASA Lewis Research Center, has successfully operated for 2 summer seasons at a remote site in Antarctica, providing utility-type power for a six-person field team. The system was installed at the Lake Hoare site for approximately 5 weeks during late 1992, put into storage for the antarctic winter, and then used again during the 1993 season. The photovoltaic power system consists of 3 silicon photovoltaic subarrays delivering a total of 1.5 kWe peak power, 3 lead-acid gel battery modules supplying 2.4 kWh, and an electrical distribution system which delivers 120 Vac and 12 Vdc to the user. The system worked extremely well in providing quiet, reliable power. The experience gained from early system demonstrations such as this should be beneficial in accelerating the transition toward future PV systems in Antarctica and other similar areas. (Auth.)

51-958

Prospects of constructing small hydrostations in the arctic zone of Yakutia.

Konstantinov, A.F., Novovitsyn, D.D., Fel'dman, B.N., *Hydrotechnical construction,* Aug. 1996, 30(2), p.109-112, Translated from Gidrotekhnicheskoe stroitel'stvo. 3 refs.

Cold weather construction, Electric power, Electric equipment, Hydrology, River basins, Cost analysis, Russia—Yakutia

51-959

Plankton and primary production in the Lena River estuary and in the south-eastern Laptev Sea.

Sorokin, IU.I., Sorokin, P.IU., *Estuarine, coastal and shelf science,* Oct. 1996, 43(4), p.399-418, 36 refs.

Oceanography, Marine biology, Estuaries, Biomass, Plankton, Ecosystems, Sedimentation, Sampling, Classifications, Nutrient cycle, Organic nuclei, Turbulent diffusion, Diurnal variations, Russia—Laptev Sea, Russia—Lena River

51-960

Kazantsevo paleobasin in northern Siberia: ecological assemblages of foraminifers and paleoenvironment.

Gus'kov, S.A., Levchuk, L.K., *Russian geology and geophysics,* 1995, 36(3), p.21-25, Translated from Geologiia i geofizika. 22 refs.

Paleoecology, Water temperature, Marine geology, Quaternary deposits, Subpolar regions, Marine deposits, Sampling, Classifications, Biogeography, Russia—Siberia

51-961

On origin of anorthosites in Pansky Tundra layered intrusion: field evidence (Kola Peninsula).

Latypov, R.M., *Russian geology and geophysics,* 1995, 36(3), p.49-56, Translated from Geologiia i geofizika. 21 refs.

Tectonics, Magma, Subpolar regions, Geologic processes, Stratification, Rock mechanics, Quaternary deposits, Stratigraphy, Russia—Kola Peninsula

51-962

Fast dynamics of glass-forming glycerol studied by dielectric spectroscopy.

Lunkenheimer, P., Pimenov, A., Dressel, M., Goncharov, IU.G., Böhmer, R., Loidl, A., *Physical review letters,* July 8, 1996, 77(2), p.318-321, 23 refs.

Polymers, Hydrocarbons, Dielectric properties, Supercooling, Liquid cooling, Phase transformations, Temperature effects, Spectroscopy, Light scattering, Spectra, Vibration

51-963

Inferring multiscale structure in atmospheric turbulence using satellite-based synthetic aperture radar imagery.

Mourad, P.D., *Journal of geophysical research,* Aug. 15, 1996, 101(C8), p.18,433-18,449, 30 refs.

Marine atmospheres, Turbulent boundary layer, Polar atmospheres, Air water interactions, Turbulent flow, Surface properties, Ice edge, Spaceborne photography, Synthetic aperture radar, Backscattering, Statistical analysis, Barents Sea

51-964

Inelastic neutron scattering studies of hydrogen bonding in ices.

Li, J.C., *Journal of chemical physics,* Oct. 22, 1996, 105(16), p.6733-6755, 76 refs.

Ice physics, Ice spectroscopy, Neutron scattering, Ice crystal optics, Ice structure, High pressure ice, Amorphous ice, Defects, Hydrogen bonds, Proton transport, Spectra, Statistical analysis

51-965

Modeling ice-cover melting using a variable heat transfer coefficient.

Sarraf, S., Zhang, X.T., *Journal of engineering mechanics,* Oct. 1996, 122(10), p.930-938, 21 refs.

Lake ice, River ice, Ice melting, Ice water interface, Ice cover thickness, Ice cover effect, Ice bottom surface, Ice edge, Heat transfer coefficient, Mathematical models

51-966
Bituminous material in arctic peat: implications for analyses of petroleum contamination.
White, D.M., Irvine, R.L., *Journal of hazardous materials,* Aug. 1996, 49(2-3), p.181-196, 14 refs.
Soil pollution, Oil spills, Crude oil, Tundra soils, Peat, Soil tests, Organic nuclei, Bitumens, Detection, Infrared spectroscopy, Environmental tests, Accuracy

51-967
Calculation of penetration of an impact tool into frozen ground.
Fedulov, A.I., Ivanov, R.A., *Journal of mining science,* July 1996, 32(2), p.123-128, Translated from Fiziko-tekhnicheskie problemy razrabotki poleznykh iskopaemykh. 2 refs.
Frozen ground mechanics, Frozen ground strength, Ice solid interface, Impact tests, Impact strength, Penetration tests, Plastic deformation, Analysis (mathematics)

51-968
Sensitivity of ERS-1 SAR to variations in soil water in fire-disturbed boreal forest ecosystems.
French, N.H.F., Kasischke, E.S., Bourgeau-Chavez, L.L., Harrell, P.A., *International journal of remote sensing,* Oct. 1996, 17(15), p.3037-3053, 27 refs.
Forest ecosystems, Spaceborne photography, Synthetic aperture radar, Brightness, Backscattering, Soil surveys, Soil water, Water content, Forest fires, Damage, Permafrost hydrology, Permafrost transformation, Evapotranspiration

51-969
Particle mixing processes of Chernobyl fallout in deep Norwegian Sea sediments: evidence for seasonal effects.
Balzer, W., *Geochimica et cosmochimica acta,* Sep. 1996, 60(18), p.3425-3433, 48 refs.
Oceanography, Subpolar regions, Water pollution, Fallout, Radioactive isotopes, Bottom sediment, Sedimentation, Turbulent diffusion, Microbiology, Sampling, Seasonal variations, Environmental tests, Drill core analysis, Statistical analysis, Norwegian Sea

51-970
Mesoscale atmospheric circulations over the southwestern Ross Sea sector, Antarctica.
Gallée, H., *Journal of applied meteorology,* July 1996, 35(7), p.1129-1141, 31 refs.
Climatology, Polar atmospheres, Marine atmospheres, Turbulent boundary layer, Atmospheric circulation, Sea ice distribution, Ice air interface, Ice cover effect, Moisture transfer, Ice heat flux, Mathematical models, Antarctica—Ross Sea
In this study the mesoscale atmospheric circulation over the southwestern Ross Sea sector during winter is examined. The hydrostatic atmospheric model MAR is used. The impact of a partial sea-ice cover on the atmospheric circulation is assessed by prescribing lead fractions in the range of the observed values. Simulations show that the propagation of katabatic airstreams over Terra Nova Bay is facilitated by the presence of leads because the identity of cold, dense, katabatic air is better marked in warmer environmental maritime conditions. Taking into account that such a lead fraction is situated in the upper range of the observed values in the central Ross Sea during winter, these results suggest that winter Ross Sea mesocyclones could not always result from a pure mesoscale forcing. It is also found that the position of the simulated mesocyclone over Terra Nova Bay is not sensitive to the lead fraction. Furthermore, this meteorological situation favors the advection of relatively mild and moist maritime air over a long distance in the ice-sheet interior. This process, which is referred to as a moist-air intrusion, could affect the antarctic ice-sheet mass balance. (Auth. mod.)

51-971
Sudden cessation of katabatic winds in Adélie Land, Antarctica.
Gallée, H., Pettré, P., Schayes, G., *Journal of applied meteorology,* July 1996, 35(7), p.1142-1152, 36 refs.
Polar atmospheres, Turbulent boundary layer, Turbulent flow, Atmospheric pressure, Wind direction, Buoyancy, Ice air interface, Ice cover effect, Topographic effects, Mathematical models, Antarctica—Adélie Coast
The evolution of summer katabatic wind events over the steep slopes of Adélie Coast is examined, with emphasis on the sudden cessation of these events. Different idealized large-scale forcings are considered, including a situation that comes very close to one observed during Nov.-Dec. 1985. The hydrostatic atmospheric model MAR is used to assess the sensitivity of the simulated cessation process to a prescribed large-scale forcing. (Auth. mod.)

51-972
Correction to "Initial results from the ICEMELT experiment: body-wave delay times and shear-wave splitting across Iceland" by Ingi Th. Bjarnason, Cecily J. Wolfe, Sean C. Solomon, and Gunnar Gudmundson. *Geophysical research letters,* Apr. 15, 1996, 23(8), p.903, For pertinent paper see 51-709.
Tectonics, Geological surveys, Earthquakes, Anisotropy, Subpolar regions, Seismic surveys, Wave propagation, Velocity measurement, Iceland

51-973
Numerical modeling of subglacial sediment deformation: implications for the behavior of the Lake Michigan Lobe, Laurentide Ice Sheet.
Jenson, J.W., MacAyeal, D.R., Clark, P.U., Ho, C.L., Vela, J.C., *Journal of geophysical research,* Apr. 10, 1996, 101(B4), p.8717-8728, 63 refs.
Pleistocene, Glacial geology, Quaternary deposits, Glacier oscillation, Ice sheets, Ice solid interface, Subglacial observations, Sediments, Substrates, Glacier beds, Deformation, Viscosity, Isostasy, Profiles, Mathematical models, United States—Michigan, Lake

51-974
Frost resistance of roller-compacted high-volume fly ash concrete—discussion.
Mather, B., Pigeon, M., *Journal of materials in civil engineering,* Nov. 1996, 8(4), p.216, 6 refs. For pertinent paper see 50-1466. Includes reply.
Concrete durability, Concrete admixtures, Mechanical properties, Frost resistance, Compaction, Porosity, Air entrainment

51-975
Toward an understanding of the surface chemical properties of ice: differences between the amorphous and crystalline surfaces.
Schaff, J.E., Roberts, J.T., *Journal of physical chemistry,* Aug. 15, 1996, 100(33), p.14,151-14,160, 37 refs.
Ice physics, Ice surface, Surface properties, Chemical properties, Ice vapor interface, Amorphous ice, Ice spectroscopy, Hydrogen bonds, Adsorption, Cloud physics, Polar stratospheric clouds, Simulation

51-976
[Preface: The UARS experiment on data collection].
Gille, J.C., ed, Massie, S.T., ed, Mankin, W.G., ed, *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.9539-9540, For individual papers see 51-977 through 51-1003 or I-56154 through I-56156, K-56150 through K-56153 and K-56157 through K-56170.
Data processing, Radiometry, Wind (meteorology), Spacecraft, Measuring instruments, Ozone
The launch of the Upper Atmosphere Research Satellite (UARS) on Sep. 12, 1991, initiated the collection of the most complete and detailed set of observations ever attempted of the atmosphere between 15 and 100 km altitude. This volume collects 46 papers that present the evaluation of the quality of those data. Most of these papers contain data between 80°N and 80°S latitudes. Nine instruments were selected to make the measurements: three to measure energy inputs into the atmosphere, four for composition and temperature, and two for winds. A Central Data Handling Facility (CDHF) processes all data. Each instrument has a plan for the full evaluation and validation of its data.

51-977
Accuracy and precision of cryogenic limb array etalon spectrometer (CLAES) temperature retrievals.
Gille, J.C., et al, *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.9583-9601, 36 refs.
Measuring instruments, Spacecraft, Stratosphere, Air temperature, Accuracy
The measurement technique is reviewed concentrating on aspects that affect the temperature determination. Comparison of many pairs of retrievals at the same location (near 32°N or 32°S) measured on sequential orbits (time separation of 96 min) shows a precision ranging from approximately 0.8 K at 68 mbar to about 3.5 K at 0.2 mbar, which agrees with simulations incorporating random noise and short-period spacecraft motions. Comparisons of globally analyzed CLAES data with National Meteorological Center (NMC) and U.K. Meteorological Office (UKMO) analyses show general agreement, with CLAES tending to be cooler by about 2 K, except in the tropics and high-latitude winter conditions. This is supported by comparisons with individual radiosondes and several lidars that indicate that the agreement is within 2 K throughout the profile (except for a narrow layer around 3 mbar). An error analysis also indicates that systematic errors should be roughly 2 K, independent of altitude. The systematic differences at low latitudes appear to be due to tropical waves, which have vertical wavelengths too short to be seen by the TIROS Operational Vertical Sounder (TOVS) instruments. There are no correlative rocketsondes or lidars to help resolve the reasons for the high-latitude differences. The area of surveillance extends to 75°- 80° N and S. (Auth. mod.)

51-978
Comparison of correlative data with HNO_3 version 7 from the CLAES instrument deployed on the NASA Upper Atmosphere Research Satellite.
Kumer, J.B., et al, *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.9621-9656, 62 refs.
Measuring instruments, Spacecraft, Stratosphere, Atmospheric composition, Chemical composition, Accuracy

51-979
Comparison of CLAES preliminary N_2O_5 data with correlative data and a model.
Kumer, J.B., et al, *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.9657-9677, 39 refs.
Measuring instruments, Spacecraft, Stratosphere, Air temperature, Atmospheric composition
The CLAES aboard the UARS has made near-global measurements of N_2O_5. Data for 388 days have been processed to version 7 (V7) for the period from Jan. 9, 1992 to Apr. 25, 1993. Results from UARS instruments, including CLAES and the ISAMS provide the first near-global N_2O_5 measurements. Retrieval below 3.16 mbar is adversely affected by aerosols and above 1.47 mbar by lack of signal and possible instrument effects, so data usage is recommended for just the three "UARS pressure surfaces" 3.16, 2.15 and 1.47 mbar. A comparison of the diurnal data variation with the model suggests there are offsets in the data that are to first order diurnally independent. At higher altitudes and latitudes the comparison improves and tends toward consistency with systematic error estimates that are based on instrument and retrieval process characterization and range from 14% at 3.16 mbar to 21% at 1.47 mbar. A similar estimate of random CLAES error ranges from 7% at 3.16 mbar 26% at 1.47 mbar. By comparison, the average values of the error estimates generated by the production processing algorithm at 3.16 and 1.47 mbar are 8 and 36%, respectively, and the average values derived from the observed data variability are 19 and 24%. Confidence is enhanced by the good global scale agreement and correlation of CLAES and ISAMS during an N_2O_5 enhancement event in early mid-Jan. 1992 polar winter. (Auth. mod.)

51-980
Validation of CH_4 and N_2O measurements by the cryogenic limb array etalon spectrometer instrument on the Upper Atmosphere Research Satellite.
Roche, A.E., et al, *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.9679-9710, 44 refs.
Measuring instruments, Spacecraft, Stratosphere, Air temperature, Atmospheric composition
CH_4 and N_2O are useful as dynamical tracers of stratospheric air transport because of their long photochemical lifetimes over a wide range of altitudes. The CLAES instrument on the UARS provided simultaneous global measurements of the altitude profiles of CH_4 and N_2O mixing ratios in the stratosphere between Oct. 1, 1991 and May 5, 1993. Data between Jan. 9, 1992 and May 5, 1993 (388 days), have been processed using version 7 data processing software, and this paper is concerned with the assessment of the quality of this data set. Each latitude was sampled 30 times per day between latitudes 34°S and 80°N, or 34°N and 80°S depending on the yaw direction of the UARS, and nearly all local times were sampled in about 36 days. This data set extends the altitude, latitude, and seasonal coverage of previous experiments, particularly in relation to measurements at high winter latitudes. Overall, the results of this validation exercise indicate that the version 7 CH_4 and N_2O data sets can be used with good confidence for quantitative and qualitative studies of stratospheric and lower-mesospheric atmospheric structure and dynamics. (Auth. mod.)

51-981
Global CF_2Cl_2 measurements by UARS cryogenic limb array etalon spectrometer: validation by correlative data and a model.
Nightingale, R.W., et al, *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.9711-9736, 61 refs.
Measuring instruments, Spacecraft, Stratosphere, Atmospheric composition, Models
The cryogenic limb array etalon spectrometer (CLAES) onboard the Upper Atmosphere Research Satellite (UARS) has obtained the first global measurements of CF_2Cl_2 over six seasons, for which 388 days have been processed in data version 7 for the period from Jan. 9, 1992, to May 5, 1993. The CLAES measurements provide a near-global view of this stratospheric species, greatly extending the altitude, latitude, and seasonal coverage of previous measurements. This work evaluates CLAES version 7 data set quality. Overall, the results of this validation exercise indicate that the CLAES version 7 CF_2Cl_2 data set, within the limitations discussed in the paper, can be used for quantitative and qualitative studies of stratospheric structure

and dynamics. Several figures and plates depict the CF_2Cl_2 mixing ratios as they pertain to the north and south polar regions. (Auth. mod.)

51-982

Comparison of cryogenic limb array etalon spectrometer (CLAES) ozone observations with correlative measurements.

Bailey, P.L., et al, *Journal of geophysical research*, Apr. 30, 1996, 101(D6), p.9737-9756, 41 refs.

Measuring instruments, Spacecraft, Ozone, Atmospheric composition

Ozone measurements made by the CLAES onboard UARS are compared to nearly coincident correlative measurements taken in 1992 and 1993 and to mean ozone distributions observed by other satellite instruments during past missions. This paper describes the CLAES measurement characteristics, uncertainties, predicted, and observed precisions and compares the observations with independent measurements both qualitatively and statistically. Satellite- and ground-based remote sensing as well as balloon-borne *in situ* measurements are represented in the correlative data set. The CLAES data are shown to be within ±20% of ll correlative measurements between 0.5 and 30 mbar. Differences at lower altitudes may be related to effects of the Pinatubo aerosol on certain of the correlative measurements and the CLAES retrieval. Comparisons with historical data from the LIMS, SAGE II, and SBUV instruments indicate good agreement with the spatial and seasonal ozone distributions seen by CLAES. The spacecraft is yawed 180° approximately every 36 days. CLAES thus obtains alternating coverage, either approximately 32°N to 80°S or 32°S to 80°N depending on the UARS flight direction. (Auth. mod.)

51-983

Validation studies using multiwavelength Cryogenic Limb Array Etalon Spectrometer (CLAES) observations of stratospheric aerosol.

Massie, S.T., et al, *Journal of geophysical research*, Apr. 30, 1996, 101(D6), p.9757-9773, 30 refs.

Measuring instruments, Spacecraft, Stratosphere, Aerosols, Atmospheric composition

Validation studies of multiwavelength CLAES observations of stratospheric aerosol are discussed. An error analysis of the CLAES aerosol extinction data is presented. Aerosol extinction precision values are estimated at latitudes and times at which consecutive UARS orbits overlap. Comparisons of CLAES aerosol data with theoretical Mie calculations, based upon *in situ* particle size measurements at Laramie, WY, are presented. CLAES aerosol data are also compared to scaled aerosol extinction measured by the Stratospheric Aerosol and Gas Experiment (SAGE II) and Atmospheric Trace Molecule Spectroscopy (ATMOS) experiments. Observed and calculated extinction spectra, from CLAES, Improved Stratospheric and Mesospheric Sounder (ISAMS), and Halogen Occultation Experiment (HALOE) data, are compared. CLAES extinction data have precisions between 10 and 25%, instrumental biases near 30%, and accuracies between 33 and 43%. Latitudes for these data extended from 32°S to 80°N and from 32°N to 80°S. (Auth. mod.)

51-984

Validation of temperature measurements from the improved stratospheric and mesospheric sounder.

Dudhia, A., Livesey, N., *Journal of geophysical research*, Apr. 30, 1996, 101(D6), p.9795-9809, 25 refs.

Measuring instruments, Stratosphere, Air temperature

Atmospheric temperature measurements from the improved stratospheric and mesospheric sounder (ISAMS) are evaluated. Flown on the UARS, ISAMS obtained 180 days of science data between Sep. 26, 1991 and July 29, 1992. Typically, over 2600 temperature profiles/day were retrieved, spaced every 200 km along the limb-viewing track and nominally extending from 100 to 0.01 mbar (15-80 km). The latitude coverage ranged from 80°S to 80°N, depending on the particular ISAMS/UARS viewing geometry on any day. UARS is in a near-Sun-synchronous orbit, so that while the 15 orbits/d are spaced approximately every 24° longitude around the equator, the sampled local solar time actually changes by 20 min/d. The ISAMS temperature retrieval process is outlined and the various products are described. A detailed error budget for the retrieval is presented and comparisons are made with temperature measurements from other sources. Finally, a table is provided summarizing the best estimates of ISAMS temperature bias and precision. The results suggest a general cold bias of around 1 K in the stratospheric temperatures, with a superimposed 2-3 K warm bias associated with the densest part of the Pinatubo aerosol cloud. The precision of individual profiles is ±2 K throughout the stratosphere but falls off in the mesosphere to about ±10 K at 80 km. The error bars produced by the retrieval appear to be reasonable (although slightly pessimistic) estimates of the precision. (Auth.)

51-985

Ozone in the middle atmosphere as measured by the improved stratospheric and mesospheric sounder.

Connor, B.J., et al, *Journal of geophysical research*, Apr. 30, 1996, 101(D6), p.9831-9841, 20 refs.

Measuring instruments, Spacecraft, Stratosphere, Ozone

The improved stratospheric and mesospheric sounder (ISAMS) made ozone measurements in the stratosphere and mesosphere, with dense coverage over a broad range of latitudes extending from 80°N to 80°S, on about 180 days between Sep. 1991 and July 1992. Used in this paper is version 10 of the ISAMS data which is recommended for use in the pressure range 10-0.1 mbar at night and 10-1 mbar during daytime. Measurements and the retrieval algorithm are described, an error analysis is presented, and comparisons of the results to both climatological and coincident data are provided. It is demonstrated that biases with respect to other well-validated sets are less than 10%, which is well within the internal assessment of systematic errors.

51-986

Measurements of methane and nitrous oxide distributions by the improved stratospheric and mesospheric sounder: retrieval and validation.

Remedios, J.J., et al, *Journal of geophysical research*, Apr. 30, 1996, 101(D6), p.9843-9871, 45 refs.

Measuring instruments, Spacecraft, Stratosphere, Atmospheric composition

This paper describes the measurement technique, the current retrieval scheme (version 10), and the data set produced. The version 10 data set comprises typically 2600 profiles/d on 180 days between Sep. 26, 1991, and July 29, 1992. Retrieved profiles extend in altitude from 7 mbar to 0.08 mbar for methane and from 7 mbar to 0.8 mbar for nitrous oxide. The precision of the data is better than 20% over much of the range and estimated systematic uncertainties are less than 30%. Comparisons with coincident measurements show that the systematic uncertainties are a reasonable estimate for the methane data but reveal a much larger positive bias for the nitrous oxide data relative to other measurements. Accounting for aerosol contamination effects and a priori biases, ISAMS methane data are recommended for use in scientific studies at altitudes between 7 mbar (5 mbar in the tropics) and 0.1 mbar. ISAMS nitrous oxide data are recommended for use between 7 mbar and 1.0 mbar where relative rather than absolute values are required. Graph presentations extend the latitudinal data coverage from 80°S to 80°N. (Auth. mod.)

51-987

Validation of nitrogen dioxide measurements from the Improved Stratospheric and Mesospheric Sounder.

Reburn, W.J., et al, *Journal of geophysical research*, Apr. 30, 1996, 101(D6), p.9873-9895, 33 refs.

Measuring instruments, Spacecraft, Stratosphere, Atmospheric composition, Chemical composition

51-988

Dinitrogen pentoxide measurements from the improved stratospheric and mesospheric sounder: validation of preliminary results.

Smith, S.E., et al, *Journal of geophysical research*, Apr. 30, 1996, 101(D6), p.9897-9906, 33 refs.

Measuring instruments, Spacecraft, Stratosphere, Atmospheric composition, Chemical composition

51-989

Measurements of water vapor distributions by the improved stratospheric and mesospheric sounder: retrieval and validation.

Goss-Custard, M., et al, *Journal of geophysical research*, Apr. 30, 1996, 101(D6), p.9907-9928, 53 refs.

Measuring instruments, Spacecraft, Stratosphere, Water vapor

51-990

Validation of measurements of carbon monoxide from the improved stratospheric and mesospheric sounder.

López-Valverde, M.A., et al, *Journal of geophysical research*, Apr. 30, 1996, 101(D6), p.9929-9955, 31 refs.

Measuring instruments, Spacecraft, Stratosphere

51-991

Validation of UARS microwave limb sounder temperature and pressure measurements.

Fishbein, E.F., et al, *Journal of geophysical research*, Apr. 30, 1996, 101(D6), p.9983-10,016, 43 refs.

Measuring instruments, Spacecraft, Stratosphere, Air temperature, Atmospheric pressure

Temperatures and tangent-point pressure are retrieved from a 15-channel 63-GHz radiometer measuring O_2 microwave emissions from the stratosphere and mesosphere. The Version 3 data (first public release) contains scientifically useful temperatures from 22 to 0.46 hPa. Accuracy estimates are based on instrument performance, spectroscopic uncertainty and retrieval numerics. Temperature accuracy is limited mainly by uncertainty in instrument characterization, and tangent-point pressure accuracy is limited mainly by the accuracy of spectroscopic parameters. Precisions are around 1 K and 100 m. Comparisons are presented among temperatures from MLS and several stations in the US and France. Problems with Version 3 MLS temperatures and tangent-point pressures are identified, but the high precision of MLS radiances will allow improvements with better algorithms planned for the future. Several of the plates present data measured at arctic and antarctic latitudes. (Auth. mod.)

51-992

Validation of UARS microwave limb sounder ozone measurements.

Froidevaux, L., et al, *Journal of geophysical research*, Apr. 30, 1996, 101(D6), p.10,017-10,060, 39 refs.

Measuring instruments, Spacecraft, Stratosphere, Air temperature, Ozone

The MLS ozone retrievals are obtained from the calibrated microwave radiances (emission spectra) in two separate bands, at frequencies near 205 and 183 GHz. Analyses focus on the MLS Version 3 data. Described are results of simulations performed to assess the quality of the retrieval algorithms, in terms of both mixing ratio and radiance closure. From actual MLS observations, the 205-GHz ozone retrievals give better closure (smaller radiance residuals) than that from the 183-GHz measurements and should be considered more accurate from the calibration aspects. However, the 183-GHz data are less noise limited in the mesosphere and can provide the most useful scientific results in that region. The retrieved 205-GHz ozone profiles in the middle-to lower stratosphere are compared to ozonesonde measurements at a wide range of latitudes and seasons; various plates include data for arctic and antarctic latitudes. Ground-based lidar data from Table Mountain, CA, provide a good reference for comparisons at higher altitudes. Based on these analyses and other factors, MLS results appear to be generally of high quality, with some biases worth mentioning. Results for the lowermost stratosphere are still in need of improvement. A set of estimated precision and accuracy values is derived for the MLS ozone data sets. (Auth. mod.)

51-993

Validation of UARS Microwave Limb Sounder ClO measurements.

Waters, J.W., et al, *Journal of geophysical research*, Apr. 30, 1996, 101(D6), p.10,091-10,127, 101 refs.

Measuring instruments, Spacecraft, Stratosphere, Atmospheric composition, Antarctica—McMurdo Station

Credibility of the measurements is established by (1) the consistency of the measured ClO spectral emission line with the retrieved ClO profiles and (2) comparisons of ClO from MLS with that from correlative measurements by balloon-based, ground-based, and aircraft-based instruments. Values of "noise" (random), "scaling" (multiplicative), and "bias" (additive) uncertainties are determined for the Version 3 data, the first version publicly released, and known artifacts in these data are identified. Comparisons with correlative measurements indicate agreement to within the combined uncertainties expected for MLS and the other measurements being compared. It is concluded that MLS Version 3 ClO data, with proper consideration of the uncertainties and "quality" parameters produced with these data, can be used for scientific analyses at retrieval surfaces between 46 and 1 hPa (approximately 20-50 km in height). Future work is planned to correct known problems in the data and improve their quality. Various plates and figures contain data for arctic and antarctic latitudes and diagrams of ClO profiles over McMurdo Station and Thule, Greenland are included. (Auth. mod.)

51-994

Validation of UARS microwave limb sounder 183 Ghz H_2O measurements.

Lahoz, W.A., et al, *Journal of geophysical research*, Apr. 30, 1996, 101(D6), p.10,129-10,149, 30 refs.

Measuring instruments, Spacecraft, Stratosphere, Moisture, Humidity

Measurements of thermal emission are used to infer the concentration of water vapor over a pressure range of 46-0.2 hPa (≈20 to ≈60 km). It is estimated that version 3 MLS H_2O retrievals are accurate to within 20-25% in the lower stratosphere and to within 8-13% in the upper stratosphere and lower mesosphere. The precision of a single profile is estimated to be ≈0.15 ppmv in the mid-stratosphere and 0.2 ppmv in the lower and upper stratosphere. In the lower mesosphere the estimate of a single profile precision is 0.25-0.45 ppmv. During polar winter conditions, H_2O retrievals at 46 hPa can have a substantial contribution from climatology. The vertical resolution of MLS H_2O retrievals is ≈5 km. Specified figures show data at 60°-80°N and S. (Auth. mod.)

51-995

Validation of hydrogen fluoride measurements made by the Halogen Occultation Experiment from the UARS platform.

Russell, J.M., III, et al, *Journal of geophysical research*, Apr. 30, 1996, 101(D6), p.10,163-10,174, 31 refs.

Measuring instruments, Spacecraft, Stratosphere, Atmospheric composition

This paper describes the characteristics of and data from the Halogen Occultation Experiment (HALOE) HF channel, including steps taken to validate the results. The on-orbit precision of the HF measurements is shown to be better than 0.04 ppbv to 0.06 ppbv throughout the stratosphere. The estimated accuracy is 14% to 27%

depending on altitude. The internal consistency of the HF measurements is excellent as judged by sunrise/sunset differences and comparison with HALOE CH_4 distributions. The mean difference between HALOE HF and correlative balloon underflight measurements is <7% from mbar to 50 mbar. Analysis of HALOE HF pressure versus longitude cross sections shows that obtaining close space and time coincidence can be very important in comparing tracer distributions. Typical characteristics of a pressure versus latitude cross section and polar orthographic projection are also discussed. Comparisons with latitudinal distributions of tracer measurements from previous experiments show similar features like the tropical double minimum due to the semiannual oscillation. All comparisons and analyses conducted provide good confidence in the validity of the HALOE HF results. Tables, plates, and figures show data for arctic and antarctic latitudes. (Auth. mod.)

51-996

Validation of Halogen Occultation Experiment CH_4 measurements from the UARS.

Park, J.H., *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.10,183-10,203, 22 refs.

Measuring instruments, Spacecraft, Stratosphere, Atmospheric composition

CH_4 mixing ratio is obtained using the gas filter correlation technique operating in the 3.3 µm region. Since measurements are made during solar occultation in the 57° inclination orbit, data are collected 15 times daily for both sunrises and sunsets. This provides coverage of one hemisphere in a month period. One complete hemispheric sweep from equator to ≈80° latitude is made during the spring and summer seasons of two hemispheres, and partial sweep from equator to around 50° latitude is made during the fall and winter seasons of two hemispheres. HALOE CH_4 measurements are validated using direct comparisons with correlative data and internal consistency checks using other HALOE-measured tracers, HF, and aerosols. It is estimated from the 0.3- to 50-mbar region that the total error, including systematic and random components, is less than 15% and that the precision is better than 7%. Simultaneous measurements of CH_4 and other HALOE species and aerosol extinction coefficients provide important information on atmospheric dynamic and chemical processes, since CH_4 can be used as a tracer and an indicator of atmospheric transport processes. Several new pieces of information on previously unreported HALOE-observed features are also presented. Figures and plates show the range of latitude for data extending into the polar regions of both hemispheres. (Auth. mod.)

51-997

Validation of measurements of water vapor from the Halogen Occultation Experiment (HALOE).

Harries, J.E., et al, *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.10,205-10,216, 24 refs.

Measuring instruments, Spacecraft, Stratosphere, Atmospheric composition, Atmospheric pressure

Measurements are made of the transmittance of the atmosphere in a number of spectral channels as the Sun rises or sets behind the limb of the atmosphere. One of the channels, at 6.60 µm, is a broadband filter channel tuned to detect absorption in the v_2 band of water vapor. This paper describes efforts to validate the absolute and relative uncertainties (accuracy and precision) of the measurements from this channel. The HALOE data have been compared with independent measurements, using a variety of observational techniques, from balloons, from the ground, and from other space missions, and with the results of a two-dimensional model. The results show that HALOE is providing global measurements throughout the stratosphere and mesosphere with an accuracy within ±10% over most of this height range, and to within ±30% at the boundaries, and to a precision in the lower stratosphere of a few percent. The observed systematic behavior and internal consistency of the HALOE data, coupled with these estimates of their accuracy, indicate that the data may be used for quantitative tests of the understanding of the physical and chemical processes which control the concentration of H_2O in the middle atmosphere. Textual references, figures, and plates show measured data in both northern and southern polar regions. (Auth. mod.)

51-998

Halogen Occultation Experiment ozone channel validation.

Brühl, C., et al, *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.10,217-10,240, 32 refs.

Measuring instruments, Spacecraft, Stratosphere, Ozone

The HALOE instrument on UARS observes vertical profiles of ozone and other gases of interest for atmospheric chemistry using the solar occultation technique. A broadband radiometer in the 9.6 µm band is used for ozone measurements. Version 17 ozone retrieved by HALOE is intercompared successfully with about 400 profiles of other sounders, including ozonesondes, lidars, balloons, rocketsondes, and other satellites. Usually, the HALOE data are within the error range of the correlative measurements between about 100 and 0.03 mbar atmospheric pressure. Between about 30 and 1 mbar, HALOE agrees typically within 5%, with a tendency to be low. In the first year of data, larger errors sometimes occur in the lower stratosphere due to the necessary correction for Pinatubo aerosol effects, but these differences do not exceed 20%. The data show internal consistency for sunrise and sunset events at the same locations. Some examples of observed ozone distributions, including both polar regions, are given. (Auth. mod.)

51-999

Validation of nitric oxide and nitrogen dioxide measurements made by the Halogen Occultation Experiment for UARS platform.

Gordley, L.L., et al, *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.10,241-10,266, 38 refs.

Measuring instruments, Spacecraft, Stratosphere, Atmospheric composition, Chemical composition

51-1000

Comparison of U.K. Meteorological Office and U.S. National Meteorological Center stratospheric analyses during northern and southern winter.

Manney, G.L., et al, *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.10,311-10,334, 27 refs.

Measuring instruments, Spacecraft, Stratosphere, Air temperature, Atmospheric circulation, Atmospheric pressure

Both UKMO and NMC analyses capture the large-scale evolution of the stratospheric circulation during Northern Hemisphere (NH) and Southern Hemisphere (SH) winters. Stronger vertical and horizontal temperature gradients develop in the UKMO than in the NMC data during stratospheric warmings; comparison with satellite measurements with better vertical resolution suggests that the stronger vertical temperature gradients are more realistic. The NH polar vortex is slightly stronger in the UKMO analyses than in the NMC in the middle and upper stratosphere, and midstratospheric temperatures are slightly lower. The SH polar vortex as represented in the UKMO analyses is stronger and colder in the midstratosphere than its representation in the NMC analyses. The UKMO analyses on occasion exhibit some difficulties in representing cross-polar flow or changes in curvature of the wind field at very high latitudes. In addition to the above study of two wintertime periods, a more detailed comparison of lower-stratospheric temperatures is done for all arctic and antarctic winter periods since the launch of the UARS. (Auth. mod.)

51-1001

Overview of UARS ozone validation based primarily on intercomparisons among UARS and Stratospheric Aerosol and Gas Experiment II measurements.

Cunnold, D.M., Froidevaux, L., Russell, J.M., Connor, B.J., Roche, A., *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.10,335-10,350, 16 refs.

Measuring instruments, Spacecraft, Stratosphere, Ozone

Comparisons of data were made from the measurements by UARS instruments, i.e., MLS, CLAES, ISAMS, and HALOE, against those measured by SAGE II. No consistent patterns were noted in which the UARS data were similar to those of SAGE II or differed to the same degree in similar locations during the same seasons. Rather, seasonal and latitudinal differences in varying amounts seemed to be the norms. Data from both polar regions are reported. (Auth. mod.)

51-1002

Combined mesosphere/thermosphere winds using WINDII and HRDI data from the Upper Atmosphere Research Satellite.

McLandress, C., Shepherd, G.G., Solheim, B.H., Burrage, M.D., Hays, P.B., Skinner, W.R., *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.10,441-10,453, 20 refs.

Measuring instruments, Spacecraft, Stratosphere, Wind velocity, Wind direction

The data analyzed cover from Feb. 1992 to Feb. 1994 and consist of both day and nighttime WINDII winds obtained from the $O(^1S)$ green line emission and mesosphere/lower thermosphere daytime HRDI winds from the O_3 atmospheric band. The combination of the WINDII and HRDI data sets is first justified by comparing all the data in the lower-thermosphere overlap region for days and orbits when both instruments were observing the same volume of atmosphere. This comparison shows good agreement between the two instruments. An analysis of the combined WINDII and HRDI winds during equinox and solstice periods is then performed. The amplification with height of the diurnal tide at equinox and its subsequent decay in the lower thermosphere are clearly demonstrated by the observations. The corresponding background (i.e., diurnal mean) zonal wind component exhibits a broad region of easterlies at lower latitudes in the upper mesosphere and lower thermosphere and westerlies at mid-latitudes. Above 120 km the mean winds revert to easterlies in the zonal component and a two-celled equator to pole meridional circulation. (Auth. mod.)

51-1003

Climatological mean wind observations from the UARS high-resolution Doppler imager and wind imaging interferometer: comparison with current reference tools.

Fleming, E.L., et al, *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.10,455-10,473, 58 refs.

Measuring instruments, Spacecraft, Stratosphere, Wind velocity, Wind direction, Climatology

The authors have used 2-3 years of UARS HRDI and WINDII observations to construct a monthly and diurnal mean zonally averaged climatology of zonal and meridional wind for the 50- to 120-km region, and to compare with the current CIRA-86 and HWM-93 reference models. Comparisons are limited to regions where the tidal oscillations can be adequately removed from the UARS observations using simple binning and averaging methods. At 50-80 km the reference models, which are based on gradient winds derived from temperatures, compare well with the HRDI data in reproducing the overall seasonal variations, including the magnitudes and positions of the winter westerly and summer easterly jets at mid-latitudes. At 95 km, HRDI and WINDII show year-round easterlies at low latitudes and indicate a strong westerly jet during summer and weaker, more variable flow during winter at mid-latitudes. The CIRA-86 gradient winds at 95 km show some qualitative agreement with the UARS data at mid-latitudes, especially in simulating the summertime jet. However, the comparison is poor at low latitudes. Although the main focus of these comparisons is on the mid-latitudes, several of the figures contain data for both polar regions. (Auth. mod.)

51-1004

Effect of sea ice on the stability and variability of the thermohaline circulation in a planetary geostrophic model.

Zhang, S., Lin, C.A., Greatbatch, R.J., *McGill University. Centre for Climate and Global Change Research. C^2GCR report,* Sep. 1993, No.93-15, 36p. + figs., WDCA 95000127, 28 refs.

Air ice water interaction, Ice cover effect, Ice heat flux, Ice water interface, Ice models, Ocean currents, Water temperature, Salinity, Computerized simulation, Mathematical models

51-1005

Coupled ice-ocean model supporting winter navigation in the Baltic Sea. Part 1: Ice dynamics and water levels.

Omstedt, A., Nyberg, L., Leppäranta, M., *Swedish Meteorological and Hydrological Institute. Reports oceanography,* Jan. 1994, SMHI RO, No.17, 17p., WDCA 95000105, 11 refs.

Sea ice distribution, Ice conditions, Ice forecasting, Ice navigation, Ice routing, Drift, Ice models, Sea level, Computerized simulation, Baltic Sea

51-1006

Coupled ice-ocean model supporting winter navigation in the Baltic Sea. Part 2: thermodynamics and meteorological coupling.

Omstedt, A., Nyberg, L., *Swedish Meteorological and Hydrological Institute. Reports oceanography,* Jan. 1995, SMHI RO, No.21, 30p. + appends., WDCA 95000106, 24 refs.

Sea ice distribution, Ice conditions, Ice forecasting, Air ice water interaction, Ice water interface, Ice heat flux, Drift, Ice models, Computerized simulation, Baltic Sea

51-1007

Simulation of the arctic sea ice cover.

Legutke, S., *Alfred-Wegener-Institut für Polar- und Meeresforschung. AWI Berichte aus dem Fachbereich Physik. Report,* Sep. 1992, No.30, 144p., WDCA 95000008, 27 refs.

Sea ice distribution, Ice conditions, Ice cover thickness, Ice edge, Air ice water interaction, Ice heat flux, Drift, Ice forecasting, Ice models, Computerized simulation

51-1008

Renovation techniques of ski areas. [Les techniques de réhabilitation des domaines skiables]

Dinger, F., *Neige et avalanches,* Sep. 1996, No.75, p.6-12,32, In French with English summary. 6 refs.

Revegetation, Protective vegetation, Soil erosion, Soil conservation, Land reclamation

51-1009

Tomorrow like yesterday?...Pattern recognition for avalanche forecast. [Demain comme hier?..."Pattern recognition" pour la prévision des avalanches]

Bolognesi, R., *Neige et avalanches,* Sep. 1996, No.75, p.13-17,32, In French with English summary. 4 refs.

Avalanche modeling, Avalanche forecasting, Image processing, Computer programs

51-1010

Avalanche: the cost of the prevention. [Avalanches: le coût de la prévention]

Brugnot, G., *Neige et avalanches,* Sep. 1996, No.75, p.18-22,32, In French with English summary. 1 ref.

Avalanche engineering, Safety, Cost analysis, France

51-1011

Assistance to the avalanche forecast in the Pyrenees. [Aide à la prévision du risque d'avalanche sur les Pyrénées]

Durand, Y., Martin, E., Mérindol, L., *Neige et avalanches,* Sep. 1996, No.75, p.23-27,32, In French with English summary. 5 refs.

Avalanche forecasting, Avalanche modeling, Snow cover stability, Meteorological factors, Computerized simulation, Pyrenees

51-1012

Correlation of snow trafficability with the physical properties and conditions of deposited snow. Final report. Part II.

Yong, R.N., Boonsinsuk, P., Mohamed, A.M.O., Alammawi, S., Caporuscio, F., Wang, B., Montreal, McGill University, Geotechnical Research Centre, July 1989, 110p., 11 refs. Submitted to the Defence Research Establishment Suffield, Ralston, Alberta.

Snow strength, Snow hardness, Snow density, Snow stratigraphy, Trafficability, Penetration tests, Environmental tests

51-1013

Physical properties and conditions of naturally deposited snow, Fernie, B.C. (February 1989). Part III.

Yong, R.N., Mohamed, A.M.O., Caporuscio, F., Alammawi, S., Montreal, McGill University, Geotechnical Research Centre, Aug. 1989, 85p., 11 refs. This is part 3 of a final report on correlation of snow trafficability with the physical properties and conditions of deposited snow, submitted to the Defence Research Establishment Suffield, Ralston, Alberta.

Snow strength, Snow hardness, Snow density, Snow compression, Trafficability

51-1014

Correlation of snow trafficability with the physical properties and conditions of deposited snow. Final report. Part IV.

Yong, R.N., Mohamed, A.M.O., Alammawi, S., Caporuscio, F., Montreal, McGill University, Geotechnical Research Centre, May 1989, 24p., Submitted to the Defence Research Establishment Suffield, Ralston, Alberta.

Snow strength, Snow hardness, Snow density, Snow compression, Trafficability, Hardness tests, Mathematical models

51-1015

Correlation of snow trafficability with the physical properties and conditions of deposited snow. Final report. Part V.

Yong, R.N., Mohamed, A.M.O., Xu, D.M., Montreal, McGill University, Geotechnical Research Centre, Aug. 1990, 28p. + appends., 12 refs. Submitted to the Defence Research Establishment Suffield, Ralston, Alberta.

Snow strength, Snow hardness, Snow density, Snow compression, Rubber snow friction, Trafficability, Bearing strength, Shear strength, Computerized simulation, Computer programs, Mathematical models

51-1016

Sea-ice conditions during ARK IX/1a,b with RV *Polarstern*: shipboard observations and satellite imagery.

Viehoff, T., Eicken, H., Ramseier, R.O., Wadhams, P., *Alfred-Wegener-Institut für Polar- und Meeresforschung. AWI Berichte aus dem Fachbereich Physik. Report,* July 1993, No.43, n.p., WDCA 95000009.

Ice surveys, Sea ice distribution, Ice conditions, Oceanographic surveys, Spaceborne photography, Greenland Sea, Fram Strait

51-1017

Snow, sea-ice and radar observations during ANT X/4: summary data report.

Drinkwater, M.R., Haas, C., *Alfred-Wegener-Institut für Polar- und Meeresforschung. AWI Berichte aus dem Fachbereich Physik. Report,* July 1994, No.53, 51p., WDCA 95000010, 6 refs.

Ice surveys, Sea ice distribution, Ice conditions, Ice cover thickness, Ice structure, Snow ice interface, Core samplers, Radio echo soundings, Oceanographic surveys, Antarctica—Weddell Sea

This report summarizes the main observations of the sea-ice and microwave radar shipborne programs during the Winter Weddell Gyre Study 1992 (WWGS '92). It provides a listing of these measurements at each site throughout the course of WWGS '92. Together with a report of general ice conditions, which comprises visual observations from the ships bridge and imagery of satellite-based SSM/I, AVHRR and SAR sensors, it is compiled to provide a database for scientists wanting to work in this region. The main goals of the sea-ice program during WWGS '92 were to investigate the energy- and mass-balance of antarctic sea ice in winter, to improve knowledge on sea-ice growth mechanisms and ice dynamics, and to provide surface validation data for the different shipborne and spaceborne microwave remote sensing measurements which were carried out simultaneously during the shipborne experiment. The sea-ice related program consisted of the following main components with the first three items summarized in this report: ice coring and subsequent laboratory analysis; snow and ice thickness measurements; shipborne microwave radar scatterometer measurements; ERS-1 and SSM/I surface validation measurements; shipborne passive microwave radiometer measurements; shipborne optical and thermal infrared measurements and standardized ice observations from the ship's bridge. (Auth. mod.)

51-1018

Evidence of recent warming and El Niño-related variations in ice breakup of Wisconsin Lakes.

Anderson, W.L., Robertson, D.M., Magnuson, J.J., *Limnology and oceanography,* July 1996, 41(5), Symposium on Regional Assessment of Freshwater Ecosystems and Climate Change in North America, Leesburg, VA, Oct. 24-26, 1994. Selected papers, p.815-821, 23 refs.

Climatology, Climatic changes, Global warming, Limnology, Lake ice, Ice breakup, Statistical analysis, Air temperature, Correlation, Long range forecasting, Seasonal variations, United States—Wisconsin

51-1019

Measuring the sensitivity of southern Wisconsin lake ice to climate variations and the lake depth using a numerical model.

Vavrus, S.J., Wynne, R.H., Foley, J.A., *Limnology and oceanography,* July 1996, 41(5), Symposium on Regional Assessment of Freshwater Ecosystems and Climate Change in North America, Leesburg, VA, Oct. 24-26, 1994. Selected papers, p.822-831, 53 refs.

Climatology, Climatic changes, Limnology, Lake ice, Surface temperature, Albedo, Freezeup, Ice breakup, Water level, Snow ice interface, Snow cover effect, Ice water interface, Mathematical models, Thermodynamic properties, Seasonal variations, United States—Wisconsin

51-1020

Determinants of temporal coherence in the satellite-derived 1987-1994 ice breakup dates of lakes on the Laurentian Shield.

Wynne, R.H., Magnuson, J.J., Clayton, M.K., Lillesand, T.M., Rodman, D.C., *Limnology and oceanography,* July 1996, 41(5), Symposium on Regional Assessment of Freshwater Ecosystems and Climate Change in North America, Leesburg, VA, Oct. 24-26, 1994. Selected papers, p.832-838, 18 refs.

Limnology, Lake ice, Ice breakup, Seasonal variations, Spaceborne photography, Radiometry, Statistical analysis, Correlation, Canada—Ontario, United States—Wisconsin, United States—North Dakota

51-1021

Climate forcing and thermal feedback of residual lake-ice covers in the high Arctic.

Doran, P.T., McKay, C.P., Adams, W.P., English, M.C., Wharton, R.A., Jr., Meyer, M.A., *Limnology and oceanography,* July 1996, 41(5), Symposium on Regional Assessment of Freshwater Ecosystems and Climate Change in North America, Leesburg, VA, Oct. 24-26, 1994. Selected papers, p.839-848, 36 refs.

Climatology, Climatic changes, Limnology, Lake ice, Water temperature, Temperature variations, Ice cover thickness, Ice melting, Degree days, Ice cover effect, Air ice water interaction, Heat balance, Seasonal variations, Statistical analysis

51-1022

Hydrologic regime of perched lakes in the Mackenzie Delta: potential responses to climate change.

Marsh, P., Lesack, L.F.W., *Limnology and oceanography,* July 1996, 41(5), Symposium on Regional Assessment of Freshwater Ecosystems and Climate Change in North America, Leesburg, VA, Oct. 24-26, 1994. Selected papers, p.849-856, 26 refs.

Climatology, Climatic changes, Deltas, Limnology, Hydrologic cycle, Ice growth, Ice cover thickness, Water level, Mathematical models, Simulation, Canada—Northwest Territories—Mackenzie Delta

51-1023

Stream hydrological and ecological responses to climate change assessed with an artificial neural network.

Poff, N.L, Tokar, S., Johnson, P., *Limnology and oceanography,* July 1996, 41(5), Symposium on Regional Assessment of Freshwater Ecosystems and Climate Change in North America, Leesburg, VA, Oct. 24-26, 1994. Selected papers, p.857-863, 33 refs.

Climatology, Climatic changes, Limnology, Hydrologic cycle, Hydrography, Ecosystems, Precipitation (meteorology), Snow hydrology, Snowmelt, Mathematical models, Simulation, Flood forecasting

51-1024

Paleolimnological records of climatic change in North America.

Fritz, S.C., *Limnology and oceanography,* July 1996, 41(5), Symposium on Regional Assessment of Freshwater Ecosystems and Climate Change in North America, Leesburg, VA, Oct. 24-26, 1994. Selected papers, p.882-889, Refs. p.886-889.

Paleoclimatology, Paleoecology, Climatic changes, Limnology, Lacustrine deposits, Quaternary deposits, Water level, Sedimentation, Models, Geochemical cycles, Correlation

51-1025

Century-scale paleoclimatic reconstruction from Moon Lake, a closed-basin lake in the northern Great Plains.

Laird, K.R., Fritz, S.C., Grimm, E.C., Mueller, P.G., *Limnology and oceanography,* July 1996, 41(5), Symposium on Regional Assessment of Freshwater Ecosystems and Climate Change in North America, Leesburg, VA, Oct. 24-26, 1994. Selected papers, p.890-902, 68 refs.

Paleoclimatology, Climatic changes, Limnology, Paleoecology, Moraines, Lacustrine deposits, Drill core analysis, Stratigraphy, Salinity, Hydrogeochemistry, Hydrologic cycle, Geochronology, Radioactive age determination, United States—South Dakota—Moon Lake

51-1026

Changes in climate and hydrochemical responses in a high-elevation catchment in the Rocky Mountains, USA.

Williams, M.W., Losleben, M., Caine, N., Greenland, D., *Limnology and oceanography,* July 1996, 41(5), Symposium on Regional Assessment of Freshwater Ecosystems and Climate Change in North America, Leesburg, VA, Oct. 24-26, 1994. Selected papers, p.939-946, 25 refs.

Climatology, Climatic changes, Synoptic meteorology, Alpine landscapes, Watersheds, Hydrogeochemistry, Precipitation (meteorology), Snow hydrology, Snowmelt, Sampling, Seasonal variations, Correlation, Statistical analysis, United States—Colorado—Niwot Ridge

51-1027

Hydrochemical modeling of Emerald Lake watershed, Sierra Nevada, California: sensitivity of stream chemistry to changes in fluxes and model parameters.

Wolford, R.A., Bales, R.C., *Limnology and oceanography,* July 1996, 41(5), Symposium on Regional Assessment of Freshwater Ecosystems and Climate Change in North America, Leesburg, VA, Oct. 24-26, 1994. Selected papers, p.947-954, 19 refs.

Watersheds, Climatology, Global warming, Limnology, Hydrogeochemistry, Stream flow, Aerosols, Ion diffusion, Snow hydrology, Snowmelt, Runoff, Seasonal variations, Models, Correlation, United States—California—Emerald Lake

51-1028

Effects of glacial meltwater inflows and moat freezing on mixing in an ice-covered antarctic lake as interpreted from stable isotope and tritium distributions.

Miller, L.G., Aiken, G.R., *Limnology and oceanography,* July 1996, 41(5), Symposium on Regional Assessment of Freshwater Ecosystems and Climate Change in North America, Leesburg, VA, Oct. 24-26, 1994. Selected papers, p.966-976, 43 refs.

Limnology, Icebound lakes, Lake ice, Ice cores, Glacier melting, Meltwater, Turbulent diffusion, Advection, Radioactive isotopes, Fallout, Solubility, Geochemical cycles, Isotope analysis, Antarctica—Fryxell, Lake

Perennially ice-covered lakes in the McMurdo Dry Valleys have risen several meters over the past two decades due to climatic warming and increased glacial meltwater inflow. To elucidate the hydrologic responses to changing climate and the effects on lake mixing processes, the authors measured the stable isotope ($\delta^{18}O$ and δD) and tritium concentrations of water and ice samples collected in the Lake Fryxell watershed from 1987 through 1990. Stable isotope enrichment resulted from evaporation in stream and moat samples and from sublimation in surface lake-ice samples. Tritium was present in deep water, suggesting that a component of bottom water was recently at the surface. During summer, melted lake ice and stream water forms the moat. Water excluded from ice formation during fall moat freezing may sink as density currents to the bottom of the lake. Seasonal lake circulation, in response to climate-driven surface inflow, is therefore responsible for the distribution of both water isotopes and dissolved solutes in Lake Fryxell. (Auth. mod.)

51-1029

Potential methane emission from north-temperate lakes following ice melt.

Michmerhuizen, C.M., Striegl, R.G., McDonald, M.E., *Limnology and oceanography,* July 1996, 41(5), Symposium on Regional Assessment of Freshwater Ecosystems and Climate Change in North America, Leesburg, VA, Oct. 24-26, 1994. Selected papers, p.985-991, 30 refs.

Limnology, Littoral zone, Lake ice, Ice melting, Natural gas, Ice air interface, Vapor transfer, Ice cover effect, Lacustrine deposits, Organic soils, Sampling, Geochemical cycles, Statistical analysis, Greenhouse effect

51-1030

Effects of climatic warming on the properties of boreal lakes and streams at the Experimental Lakes Area, northwestern Ontario.

Schindler, D.W., et al, *Limnology and oceanography,* July 1996, 41(5), Symposium on Regional Assessment of Freshwater Ecosystems and Climate Change in North America, Leesburg, VA, Oct. 24-26, 1994. Selected papers, p.1004-1017, 50 refs.

Climatology, Global warming, Geochemical cycles, Limnology, Lake ice, Ice melting, Sediment transport, Biomass, Meteorological factors, Seasonal freeze thaw, Runoff, Hydrography, Seasonal variations, Statistical analysis, Canada—Ontario—Experimental Lakes Area

51-1031

Effects of ultraviolet radiation on periphyton in an alpine lake.

Vinebrooke, R.D., Leavitt, P.R., *Limnology and oceanography,* July 1996, 41(5), Symposium on Regional Assessment of Freshwater Ecosystems and Climate Change in North America, Leesburg, VA, Oct. 24-26, 1994. Selected papers, p.1035-1040, 50 refs.

Limnology, Alpine landscapes, Lake water, Ecosystems, Biomass, Algae, Ultraviolet radiation, Radiation absorption, Environmental impact, Sampling, Statistical analysis

51-1032

Global warming impacts on lake trout in arctic lakes.

McDonald, M.E., Hershey, A.E., Miller, M.C., *Limnology and oceanography,* July 1996, 41(5), Symposium on Regional Assessment of Freshwater Ecosystems and Climate Change in North America, Leesburg, VA, Oct. 24-26, 1994. Selected papers, p.1102-1108, 50 refs.

Limnology, Climatology, Global warming, Ecosystems, Biomass, Lake water, Water temperature, Temperature effects, Seasonal variations, Models, Simulation, Environmental impact

51-1033

Simulation model to study pollution dynamics in the arctic basin.

Krapivin, V.F., *Oceanology,* May-June 1996, 35(3), p.336-345, Translated from Okeanologiia. 38 refs.

Oceanography, Water pollution, Environmental protection, Ecosystems, Computer programs, Radioactive wastes, Hydrocarbons, Metals, Hydrogeochemistry, Mathematical models, Simulation, Forecasting, Arctic Ocean

51-1034

Basic notions of distribution of optical water properties in the Kara Sea.

Burenkov, V.I., Gol'din, IU.A., Gureev, B.A., Sud'bin, A.I., *Oceanology,* May-June 1996, 35(3), p.346-357, Translated from Okeanologiia. 8 refs.

Oceanography, Subpolar regions, Sea water, Optical properties, Boundary layer, Water structure, Turbidity, Transparence, Suspended sediments, Organic nuclei, Attenuation, Sampling, Photometry, Russia—Kara Sea

51-1035

Results of gasometric investigations in the Kara Sea.

Bol'shakov, A.M., Egorov, A.V., *Oceanology,* May-June 1996, 35(3), p.368-373, Translated from Okeanologiia. 4 refs.

Oceanography, Subpolar regions, Estuaries, Natural gas, Hydrocarbons, Suspended sediments, Bottom sediment, Distribution, Profiles, Sampling, Geochemistry, Russia—Kara Sea

51-1036

Clay mineral distribution in surface sediments of the southwestern Kara Sea.

Shelekhova, E.S., Levitan, M.A., Pavlidis, IU.A., Nurnberg, D., Wahsner, M., *Oceanology,* May-June 1996, 35(3), p.403-406, Translated from Okeanologiia. 5 refs.

Oceanography, Sedimentation, Bottom sediment, Sediment transport, Ocean currents, Clay minerals, Distribution, Sampling, X ray analysis, Russia—Kara Sea

51-1037

Novaya Zemlya shelf in the late Quaternary.

Dunaev, N.N., Levchenko, O.V., Merklin, L.R., Pavlidis, IU.A., *Oceanology,* May-June 1996, 35(3), p.407-416, Translated from Okeanologiia. 7 refs.

Oceanography, Pleistocene, Marine geology, Tectonics, Subpolar regions, Marine deposits, Moraines, Bottom sediment, Quaternary deposits, Bottom topography, Profiles, Radio echo soundings, Sedimentation, Russia—Novaya Zemlya

51-1038

Features of streamer noise during marine seismic explorations under ice conditions.

Buravtsev, V.IU., *Oceanology,* May-June 1996, 35(3), p.435-437, Translated from Okeanologiia. 1 ref.

Oceanography, Engines, Noise (sound), Seismic reflection, Ice cover thickness, Underwater acoustics, Ice acoustics, Sound transmission, Spectra, Wave propagation, Ice water interface, Ice cover effect, Exploration

51-1039

Atlantic water layer in the Arctic Basin. 1. Geographical description.

Dmitriev, N.E., Poliakov, I.V., *Russian meteorology and hydrology,* 1995, No.8, p.19-23, Translated from Meteorologiia i gidrologiia. 13 refs.

Oceanography, Hydrography, Water structure, Stratigraphy, Layers, Water temperature, Salinity, Seasonal variations, Thermal regime, Temperature variations, Arctic Ocean

51-1040

Small-scale structure of internal stresses in consolidated ice cover.

Sukhorukov, K.K., *Russian meteorology and hydrology,* 1995, No.8, p.40-47, Translated from Meteorologiia i gidrologiia. 15 refs.

Sea ice, Pack ice, Ice microstructure, Anisotropy, Ice mechanics, Cracking (fracturing), Ice deformation, Stress concentration, Attenuation, Mechanical tests, Statistical analysis

Results of field measurements of internal stresses in arctic and antarctic pack ice are presented. The main features of the internal stress field structure for various ice concentrations in a small area are identified. (Auth.)

51-1041

Atmospheric and environmental influences on wintertime shortwave radiation, San Juan Mountains, Colorado, U.S.A.

Stanitski-Martin, D., *Mountain research and development,* Aug. 1996, 16(3), p.199-210, With French and German summaries. 36 refs.

Microclimatology, Meteorological factors, Alpine landscapes, Solar radiation, Radiation balance, Snow cover effect, Topographic effects, Computerized simulation, Radiometry, Seasonal variations, United States—Colorado—San Juan Mountains

51-1042

Segment-scale patterns and hydraulics of trace metal concentrations in fine grain sediments of a cobble and boulder bed mountain stream, southeast Alaska.

Marcus, W.A., *Mountain research and development,* Aug. 1996, 16(3), p.211-220, With French and Germany summaries. 38 refs.

Limnology, Glacial rivers, Hydraulics, Stream flow, Bedrock, Metals, Placer mining, Geochemistry, Sedimentation, Sediment transport, Shear stress, Mathematical models, Environmental tests, United States—Alaska

51-1043

Environmental effects on radiation fluxes during the pre-monsoon, 4,170-5,525 m, Annapurna region, Nepal.

Marcus, M.G., Brazel, A.J., *Mountain research and development,* Aug. 1996, 16(3), p.221-234, With French and German summaries. 23 refs.

Microclimatology, Radiation balance, Alpine landscapes, Atmospheric boundary layer, Insolation, Topographic effects, Radiometry, Snow cover effect, Snowmelt, Albedo, Statistical analysis, Nepal—Annapurna Himal

51-1044

***Chesneya nubigena* on a Himalayan glacial moraine: a case of facilitation in primary succession?**

Jacquez, G.M., Patten, D.T., *Mountain research and development,* Aug. 1996, 16(3), p.265-273, With French and German summaries. 23 refs.

Alpine landscapes, Plant ecology, Revegetation, Grasses, Moraines, Hummocks, Growth, Vegetation patterns, Soil temperature, Topographic features, Microrelief, Snow accumulation, Mathematical models, Nepal—Himalaya Mountains

51-1045

Atmospheric circulation patterns associated with heavy snowfall events, Bridger Bowl, Montana, U.S.A.

Birkeland, K.W., Mock, C.J., *Mountain research and development,* Aug. 1996, 16(3), p.281-286, With French and German summaries. 21 refs.

Climatology, Synoptic meteorology, Atmospheric circulation, Turbulent boundary layer, Snow air interface, Snowfall, Snow accumulation, Avalanche forecasting, Weather forecasting, Seasonal variations, Statistical analysis, United States—Montana—Bridge Bowl

51-1046

Cenozoic glaciation: the marine record established by ocean drilling.

Domack, E.W., Domack, C.R., Washington, D.C., Joint Oceanographic Institutions, Inc./U.S. Science Support Program, [1992], 49p., Refs. p.46-48.

Glacial geology, Marine geology, Glaciation, Paleoclimatology, Ice formation, Geocryology, Offshore drilling, Antarctica—Weddell Sea, Antarctica—Prydz Bay, —Kerguelen Plateau

This booklet covers the results of 5 Ocean Drilling Program high-latitude cruises, 2 in the Northern Hemisphere (Legs 104 and 105) and 3 in the Southern Hemisphere (Legs, 113, 119, and 120). An introductory series of topics is covered in the first section of this booklet, providing background information on ocean drilling, marine geology, and glaciology. Another section is arranged by cruise (Leg 104-Norwegian Sea, Leg 105-Labrador Sea and Baffin Bay, Leg 113-Weddell Sea, Leg 119-Prydz Bay, and Leg 120-Kerguelen Plateau) and is devoted to the description and interpretation of specific site data. The evidence provided from the marine sedimentary record indicates that cryospheric development in the Southern Hemisphere (Antarctica) preceded that in the Northern Hemisphere by at least 30 m.y. The temporal disparity in the onset of ice cover between the hemispheres is due, in large part, to the geographic and oceanographic isolation of the antarctic continent.

51-1047

Interaction of HCl molecules with ice under conditions modeling the polar stratosphere.

Popov, A.M., Popovicheva, O.B., Rakhimova, T.V., Feoktistov, V.A., *Russian journal of physical chemistry,* 1995, 69(11), p.1823-1828, Translated from Zhurnal fizicheskoĭ khimii. 16 refs.

Ozone, Atmospheric composition, Polar stratospheric clouds, Air pollution, Ice air interface, Experimentation, Low temperature research

Interaction of HCl with ice, imitating the surface of particles of polar stratospheric clouds, was investigated under laboratory conditions. A surface-diffusion model describing the surface processes and HCl dissolving in the bulk of the ice was constructed. On the basis of analysis of the experimental results obtained under static conditions, the constants of the reaction were obtained: coefficient of adhesion, frequency of desorption, and coefficient of HCl diffusion in the ice. The dynamics of interaction of HCl molecules in the flow reactor was described in terms of a model for adsorption-wave propagation. The behavior of the desorption spectrum and the independence of the amount of the desorbed HCl on the thickness of the ice were elucidated. Possible causes of discrepancy between the experimental findings of different research groups were considered.

51-1048

Patterns of soil formation in the central Siberian upland.

Ershov, IU.I., *Eurasian soil science,* Oct. 1996, 28(10), p.29-37, Translated from Pochvovedenie. 14 refs.

Soil formation, Ecology, Taiga, Tundra soils, Classifications, Cryoturbation, Permafrost bases, Soil profiles, Geocryology, Lithology, Sampling, Terraces, Russia—Siberia

51-1049

Mineral transformation in soils of the taiga-forest zone as a function of their degree of hydromorphism.

Zvereva, T.S., *Eurasian soil science,* Oct. 1996, 28(10), p.47-56, Translated from Pochvovedenie. 32 refs.

Taiga, Forest soils, Soil formation, Minerals, Cryogenic soils, Particle size distribution, Soil freezing, Soil water migration, Coagulation

51-1050

Water reserves in soils as affected by global climatic warming: example forecast for eastern Europe.

Velichko, A.A., Karpachevskiĭ, L.O., Morozova, T.D., *Eurasian soil science,* Oct. 1996, 28(10), p.57-69, Translated from Pochvovedenie. 13 refs.

Soil water, Water supply, Desiccation, Water storage, Global warming, Tundra soils, Taiga, Soil temperature, Long range forecasting, Seasonal variations

51-1051

Hydrothermic gradients in soils under forest and steppe, divergence rates of cryogenic soils on forest-cut areas.

Kulikov, A.I., Korsunov, V.M., Dugarov, V.I., *Eurasian soil science,* Oct. 1996, 28(10), p.146-153, Translated from Pochvovedenie. 15 refs.

Forest soils, Steppes, Cryogenic soils, Active layer, Frozen ground chemistry, Permafrost hydrology, Permafrost heat transfer, Soil temperature, Temperature variations, Water content, Soil texture

51-1052

Industrially caused changes in soils of the taiga and tundra zones in the Komi Republic.

Rusanova, G.V., *Eurasian soil science,* Oct. 1996, 28(10), p.293-305, Translated from Pochvovedenie. 9 refs.

Soil pollution, Tundra soils, Forest ecosystems, Taiga, Air pollution, Fallout, Metals, Radioactive wastes, Environmental impact, Hydrogeochemistry, Sampling, Russia—Komi

51-1053

Calculation model for thawing of soil, sediments, and peat bogs.

Stotland, D.M., *Eurasian soil science,* Oct. 1996, 28(10), p.462-474, Translated from Pochvovedenie. 13 refs.

Geocryology, Cryogenic soils, Active layer, Ground thawing, Frozen ground thermodynamics, Soil temperature, Thaw depth, Thermal regime, Peat, Active layer, Forecasting, Mathematical models

51-1054

Displacement of residual crude oil by activated microflora in West Siberian oilfields.

Svarovskaia, L.I., Altunina, L.K., Rozhenkova, Z.A., Nazina, I.V., *Petroleum chemistry,* May 1996, 36(1), p.50-53, Translated from Neftekhimiia. 3 refs.

Microbiology, Bacteria, Crude oil, Oil recovery, Linings, Geochemistry, Fluid dynamics, Ecology, Environmental protection, Russia—Siberia

51-1055

Five million year ^{10}Be record in Chinese loess and red-clay: climate and weathering relationships.

Gu, Z.Y., et al, *Earth and planetary science letters,* Oct. 1996, 144(1-2), p.273-287, 27 refs.

Paleoclimatology, Pleistocene, Loess, Clay soils, Weathering, Stratigraphy, Sedimentation, Leaching, Geochronology, Radioactive age determination, Isotope analysis, Geochemical cycles, China

51-1056

^{32}Si in precipitation: evaluation of temporal and spatial variation and as dating tool for glacial ice.

Morgenstern, U., Taylor, C.B., Parrat, Y., Gäggeler, H.W., Eichler, B., *Earth and planetary science letters,* Oct. 1996, 144(1-2), p.289-296, 31 refs.

Glaciology, Ice dating, Precipitation (meteorology), Snow composition, Sampling, Isotope analysis, Radioactive isotopes, Dust, Fallout, Correlation, Scavenging

51-1057

Modelling ice-sheet sensitivity to Late Weichselian environments in the Svalbard-Barents Sea region.

Siegert, M.J., Dowdeswell, J.A., *Journal of quaternary science,* 1995, 10(1), p.33-43, 40 refs.

Pleistocene, Paleoclimatology, Marine geology, Glacial geology, Ice sheets, Glaciation, Ice shelves, Sea level, Calving, Grounded ice, Quaternary deposits, Sedimentation, Geochronology, Mathematical models, Ice models, Barents Sea, Norway—Svalbard

51-1058

Comparison of airborne electromagnetic ice thickness data with NOAA/AVHRR and ERS-1/SAR images.

Prinsenberg, S.J., Peterson, I.K., Holladay, S., *Atmosphere-ocean,* 1996, 34(1), p.185-205, With French summary. 11 refs.

Sea ice distribution, Ice cover thickness, Ice surveys, Ice detection, Seasonal variations, Aerial surveys, Spaceborne photography, Synthetic aperture radar, Radiometry, Probes, Lasers, Sensor mapping, Resolution

51-1059

Amphibious ice-breaking craft. *Ship & boat international,* Dec. 1974, 27(12), p.20.

Ships, Ice breaking, Air cushion vehicles, Mechanical tests, Performance

51-1060

Spatio-temporal prediction of snow water equivalent using the Kalman filter.

Huang, H.C., Cressie, N., *Computational statistics & data analysis,* 1996, Vol.22, p.159-175, 10 refs.

Snow hydrology, River basins, Snow water equivalent, Seasonal variations, Long range forecasting, Runoff forecasting, Statistical analysis, Mathematical models, Simulation, Water supply

51-1061

Kinetic friction of ice.

Evans, D.C.B., Nye, J.F., Cheeseman, K.J., *Royal Society of London. Proceedings. Series A,* Jan. 27, 1976, 347(1651), p.493-512, 13 refs.

Ice physics, Ice mechanics, Ice solid interface, Metal ice friction, Ice melting, Heat loss, Thermal diffusion, Thermal conductivity, Sliding, Mechanical tests

51-1062

Fourier transform infrared spectrometry studies of surface and bulk porosity of water ice.

Givan, A., Loewenschuss, A., Nielsen, C.J., *Vibrational spectroscopy,* 1996, Vol.12, p.1-14, 44 refs.

Ice physics, Ice spectroscopy, Infrared spectroscopy, Ice structure, Porosity, Amorphous ice, Ice solid interface, Ice vapor interface, Adsorption, Spectra, Temperature effects, Low temperature tests

51-1063

Report on Workshop on Glaciers, Ice Sheets, and Sea Level, Fjaerland, Norway, 21-22 June, 1996. Executive summary. Norway, International Arctic Science Committee, 1996, 7p., 17 refs.

Meetings, Glaciology, Oceanography, Sea level, Sea ice distribution, Global change, Ice sheets, Ice cover effect, Research projects

51-1064

Detrending turbulence time series with wavelets.

Andreas, E.L., Treviño, G., MP 3828, Workshop on Nonstationary Random Processes and Their Applications, 2nd, San Diego, CA, June 11-12, 1995. Proceedings. Current topics in nonstationary analysis, Singapore, World Scientific Publishing Co., 1996, p.35-73, 23 refs.

Atmospheric physics, Climatology, Atmospheric boundary layer, Turbulence, Detection, Wave propagation, Periodic variations, Mathematical models, Spectra, Statistical analysis, Correlation

Wavelets are a new class of basis functions that are finding wide use for analyzing and interpreting turbulence data. Here the authors describe a new use for wavelets: identifying trends in turbulence time series. The inverted Haar wavelet and the elephant wavelet are used, respectively, to estimate the first-order and second-order coefficients in the trend polynomial. The analysis shows that wavelet trend detection is roughly half as accurate as least-squares trend detection when accuracy is evaluated in terms of the mean-square error in estimates of the first-order and second-order trend coefficients. Wavelet

trend detection is first demonstrated with artificial data and then with various data collected in the atmospheric surface layer. Guidelines are provided on when linear and quadratic trends are "significant" enough to require removal from turbulence series. (Auth. mod.)

51-1065

Persistence of white phosphorus (P_4) particles in salt marsh sediments.

Walsh, M.E., Collins, C.M., Racine, C.H., MP 3829, *Environmental toxicology and chemistry,* 1996, 15(6), p.846-855, 19 refs.

Wetlands, Estuaries, Water pollution, Bottom sediment, Soil pollution, Explosives, Aerosols, Sedimentation, Environmental impact, Environmental tests, Sampling, Temperature effects, Saturation

Remediation of sediments at Eagle River Flats, AK, a salt marsh contaminated with solid particles of white phosphorus (P_4), may require severe alterations of the wetland by dredging, draining, or covering. However, some sediments may undergo decontamination naturally in areas that are seasonally subaerially exposed. The persistence of millimeter-size P_4 particles was studied in laboratory and field experiments. White phosphorus particles were found to be persistent in saturated sediments. In unsaturated sediments, loss was rapid (within 24 h) at 20°C, and was retarded by low temperatures. (Auth. mod.)

51-1066

Scots pine needle surfaces on radial transects across the north boreal area of Finnish Lapland and the Kola Peninsula of Russia.

Turunen, M., Huttunen, S., *Environmental pollution,* Sep. 27, 1996, 93(2), p.175-194, Refs. p.192-194.

Forest ecosystems, Plant ecology, Air pollution, Aerosols, Plant tissues, Wettability, Degradation, Climatic factors, Environmental impact, Sampling, Scanning electron microscopy, Statistical analysis, Finland—Lapland, Russia—Kola Peninsula

51-1067

Landslides at Rock Glacier site, Highwood Pass, Alberta.

McAffee, R.P., Cruden, D.M., *Canadian geotechnical journal,* Oct. 1996, 33(6), p.685-695, With French summary. 26 refs.

Landslides, Bedrock, Mass transfer, Slope stability, Rock mechanics, Frost action, Weathering, Freeze thaw cycles, Talus, Geomorphology, Canada—Alberta—Highwood Pass

51-1068

Effects of freezing and thawing on the hydraulic conductivity of paper mill sludges used as landfill covers.

Moo-Young, H.K., Jr., Zimmie, T.F., *Canadian geotechnical journal,* Oct. 1996, 33(6), p.783-792, With French summary. 36 refs.

Waste treatment, Sludges, Clay soils, Earth fills, Freeze thaw cycles, Freeze thaw tests, Linings, Covering, Hydraulics, Water content, Permeability, Thin sections, Structural analysis

51-1069

Influence of thawing rate and fungal infection by *Rhizosphaera kalkhoffii* on freezing injury in red spruce (*Picea rubens*) needles.

Manter, D.K., Livingston, W.H., *Canadian journal of forest research,* June 1996, 26(6), p.918-927, With French summary. 48 refs.

Trees (plants), Microbiology, Fungi, Plant physiology, Freeze thaw cycles, Plant tissues, Damage, Thawing rate, Photosynthesis, Cold weather survival, Cold weather tests, Temperature effects

51-1070

Inbreeding effects on the spring frost hardiness of coastal Douglas-fir.

Shortt, R.L., Hawkins, B.J., Woods, J.H., *Canadian journal of forest research,* June 1996, 26(6), p.1049-1054, With French summary. 21 refs.

Forest ecosystems, Trees (plants), Frost resistance, Plant ecology, Plant tissues, Damage, Classifications, Cold weather survival, Cold weather tests, Viability

51-1071

Vegetation model for the Sayan Mountains, southern Siberia.

Monserud, R.A., Tchebakova, N.M., *Canadian journal of forest research,* June 1996, 26(6), p.1055-1068, With French summary. Refs. p.1066-1068.

Forest ecosystems, Climatology, Vegetation patterns, Classifications, Taiga, Tundra terrain, Tundra vegetation, Models, Radiation balance, Albedo, Russia—Siberia

51-1072

Late Quaternary sequence stratigraphy of the Mackenzie Delta.

Hill, P.R., *Canadian journal of earth sciences,* July 1996, 33(7), p.1064-1074, With French summary. 31 refs.

Pleistocene, Deltas, Glacial geology, Glacial deposits, Glacier oscillation, Subarctic landscapes, Quaternary deposits, Seismic surveys, Geological surveys, Seismic reflection, Geomorphology, Stratigraphy, Shoreline modification, Canada—Northwest Territories—Mackenzie Delta

51-1073

Last glaciation and sea level history of Fosheim Peninsula, Ellesmere Island, Canadian high arctic.

Bell, T., *Canadian journal of earth sciences,* July 1996, 33(7), p.1075-1086, With French summary. 58 refs.

Arctic landscapes, Pleistocene, Geomorphology, Landforms, Glaciation, Marine geology, Glacial geology, Glacier oscillation, Sea level, Stratigraphy, Marine deposits, Radioactive age determination, Canada—Northwest Territories—Ellesmere Island

51-1074

Contributions of fine root production and turnover to the carbon and nitrogen cycling in taiga forests of the Alaska interior.

Ruess, R.W., Van Cleve, K., Yarie, J., Viereck, L.A., *Canadian journal of forest research,* Aug. 1996, 26(8), p.1326-1336, With French summary. 55 refs.

Forest ecosystems, Taiga, Plant physiology, Roots, Organic soils, Decomposition, Soil air interface, Vapor transfer, Geochemical cycles, Biomass, Nutrient cycle, Sampling, United States—Alaska—Bonanza Creek

51-1075

Freezing temperatures and exposure times during bud break and shoot elongation influence survival and growth of containerized black spruce (*Picea mariana*) seedlings.

Bigras, F.J., Hébert, C., *Canadian journal of forest research,* Aug. 1996, 26(8), p.1481-1489, With French summary. 27 refs.

Forestry, Trees (plants), Frost resistance, Cold weather survival, Viability, Growth, Damage, Cold weather tests, Cold tolerance, Temperature effects, Statistical analysis

51-1076

Frost hardiness of *Thuja plicata* and *Pseudotsuga menziesii* seedlings when nutrient supply varies with season.

Hawkins, B.J., Henry, G., Whittington, J., *Canadian journal of forest research,* Aug. 1996, 26(8), p.1509-1513, With French summary. 23 refs.

Forestry, Trees (plants), Frost resistance, Cold tolerance, Plant tissues, Damage, Nutrient cycle, Seasonal variations, Viability, Cold weather tests, Temperature measurement, Temperature effects

51-1077

Euphausiids in the Laptev Sea.

Timofeev, S.F., *Oceanology,* Sep.-Oct. 1995, 35(5), p.668-671, Translated from Okeanologiia. 12 refs.

Marine biology, Biomass, Plankton, Ecosystems, Oceanographic surveys, Sampling, Ecosystems, Distribution, Migration, Classifications, Russia—Laptev Sea

51-1078

Springtime sensible heat, nutrients and phytoplankton in the Northwater Polynya, Canadian Arctic.

Lewis, E.L., Ponton, D., Legendre, L., Leblanc, B., *Continental shelf research,* Dec. 1996, 16(14), p.1775-1792, 33 refs.

Marine biology, Oceanography, Polynyas, Biomass, Plankton, Nutrient cycle, Hydrography, Heat flux, Sampling, Seasonal variations, Canada—Northwest Territories—Smith Sound

51-1079

Earthquake recurrence and glacial loading in western Washington.

Thorson, R.M., *Geological Society of America. Bulletin,* Sep. 1996, 108(9), p.1182-1191, 51 refs.

Pleistocene, Tectonics, Marine geology, Earthquakes, Ice sheets, Glacial geology, Ice loads, Ice cover effect, Stress concentration, Isostasy, Stratigraphy, Seismology, United States—Washington

51-1080

Measurements of the evolution of porosity in a mushy layer.

Jahrling, K., Tait, S., *Journal of crystal growth,* Sep. 1996, 167(1-2), p.285-291, 17 refs.

Phase transformations, Solutions, Frozen ground mechanics, Sands, Ice crystal growth, Solidification, Liquid phases, Porosity, Anisotropy, Simulation, Thermodynamic properties, Soil cement

51-1081

Radioactive contamination of the former USSR from nuclear tests over Novaya Zemlya in the fall of 1961.

Izrael, IU.A., Volkov, A.S., Kovalev, A.F., *Russian meteorology and hydrology,* 1995, No.5, p.1-6, Translated from Meteorologiia i gidrologiia. 9 refs.

Nuclear explosions, Fallout, Pollution, Radioactive isotopes, Isotope analysis, Snow composition, Snow impurities, Meltwater, Sampling, Distribution, Environmental tests, Statistical analysis, Correlation, Russia—Novaya Zemlya

51-1082

Simulation of iceberg motion in the southern Kara Sea.

Elisov, V.V., *Russian meteorology and hydrology,* 1995, No.5, p.56-62, Translated from Meteorologiia i gidrologiia. 6 refs.

Oceanography, Offshore structures, Underground pipelines, Sea ice distribution, Icebergs, Ice scoring, Drift, Simulation, Mathematical models, Ice forecasting, Russia—Kara Sea

51-1083

Artificial dispersal of supercooled fogs at airports using liquid nitrogen.

Vlasiuk, M.P., Mukiĭ, N.G., Chernikov, A.A., *Russian meteorology and hydrology,* 1995, No.4, p.26-36, Translated from Meteorologiia i gidrologiia. 5 refs.

Airports, Fog dispersal, Cloud physics, Cloud seeding, Ice nuclei, Supercooled fog, Liquefied gases, Cold weather performance, Wind factors

51-1084

Evaluation of modification efficiency and additional precipitation falling from convective clouds.

Beriulev, G.P., Beliaev, V.P., Danelian, B.G., Zimin, B.I., Koloskov, B.P., Chernikov, A.A., *Russian meteorology and hydrology,* 1995, No.4, p.37-51, Translated from Meteorologiia i gidrologiia. 25 refs.

Precipitation (meteorology), Weather modification, Cloud physics, Convection, Radar echoes, Cloud seeding, Modification, Meteorological factors, Silver iodide

51-1085

Limits on the CO_2 content of the Martian polar deposits.

Mellon, M.T., *Icarus,* Nov. 1996, 124(1), p.268-279, 63 refs.

Mars (planet), Extraterrestrial ice, Climatic changes, Carbon dioxide, Ice sheets, Ice accretion, Ice physics, Ice composition, Ice thermal properties, Stability, Clathrates, Phase transformations, Thermal conductivity, Ice cover effect

51-1086

Latitude variations of the polar caps on Ganymede.

Hillier, J., Helfenstein, P., Veverka, J., *Icarus,* Nov. 1996, 124(1), p.308-317, 17 refs.

Satellites (natural), Extraterrestrial ice, Polar regions, Frost, Layers, Thickness, Optical properties, Albedo, Photometry, Models

51-1087

Urban snow deposits—pathways of pollutants.

Viklander, M., *Science of the total environment,* Oct. 28, 1996, Vol.189-190, International Symposium on Highway and Urban Pollution, 5th, Copenhagen, Denmark, May 22-24, 1995. Proceedings, p.379-384, 7 refs.

Streets, Snow accumulation, Snow removal, Snow disposal, Snow impurities, Water pollution, Sedimentation, Metals, Meltwater, Sampling, Environmental tests

51-1088

Source location and tracking capability of a small seismic array.

Morna, M.L., Albert, D.G., CR 96-08, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* June 1996, 34p., ADA-314 507, 19 refs.

Military operation, Vehicles, Orientation, Remote sensing, Boreholes, Detonation waves, Sound waves, Detection, Wave propagation, Seismic reflection, Seismic velocity, Spectra, Statistical analysis

Recordings of seismic wavefields from various sources were obtained using a small array of vertical-component geophones under winter conditions at Grayling, MI. These data were processed using a frequency-wavenumber domain Capon minimum variance beamformer to estimate the bearing angle and propagation velocity of the waves emitted from the source. The wave sources were sledgehammer blows on the ground surface, .45 caliber blank pistol shots, and an M60 tank moving along a road near the array. Reliable wavenumber spectra were obtained for all sources. Processing results for the hammer blows show that the dominant seismic arrival is a Rayleigh wave traveling at roughly 220 m/s. For the pistol shots, two arrivals corresponding to the airwave (338 m/s) and the air-coupled Rayleigh waves (220 m/s) were observed. For the moving vehicle, the dominant signals observed were Rayleigh waves (220 m/s). Accurate locations were obtained for this moving source, although the processing parameters had to be carefully selected, and the choice of frequency parameters affected the accuracy of the wavenumber results. The sensitivity of the wavenumber estimates to the frequency processing parameters seems to be related to the bias in the phase spectra of the signals and will potentially occur in any bearing estimation method that uses temporal frequency phase spectra.

51-1089

Southern hemisphere climate system recovery from 'instantaneous' sea-ice removal.

Wu, X., Simmonds, I., Budd, W.F., *Royal Meteorological Society. Quarterly journal A,* Oct. 1996, 122(535), p.1501-1520, 48 refs.

Climatology, Climatic changes, Sea ice distribution, Ice cover effect, Ice removal, Ice formation, Heat flux, Turbulent flow, Atmospheric circulation, Simulation, Ice models, Mathematical models, Long range forecasting

A coupled atmosphere-sea-ice model has been used to investigate the temporal response to instantaneous antarctic sea-ice removal under the present external climate conditions. Here the authors examine the timescale and nature of the ice and atmospheric relaxation back to 'control' conditions. Several experiments were carried out, either supposing that all the sea ice was removed at certain times of year, or that it was removed only over certain large areas. For the 'whole sea-ice removal' experiment the maximum impact was found to occur when the removal was made at the time of sea-ice maximum (Sep.) and least reaction near the minimum. In both cases the return to normal occurred by the middle of the following winter. The atmospheric responses comprised reduced difference between precipitation and evaporation over the ocean and increased over the antarctic continent. The air temperature changes spread through the troposphere and tended to reduce the circumpolar westerlies north of and over the sea-ice zone. The reaction to the regional sea-ice removals was more local and depended on where the region was located relative to the mean circulation pattern around and over Antarctica. (Auth. mod.)

51-1090

Talus and pediment flatirons—indicators of climatic change on scarp slopes on the Colorado Plateau, USA.

Schmidt, K.H., *Zeitschrift für Geomorphologie,* Apr. 1996, Vol.103(suppl.), p.135-158, With German and French summaries. 49 refs.

Geomorphology, Pleistocene, Paleoclimatology, Climatic changes, Paleoecology, Vegetation patterns, Terraces, Talus, Periglacial processes, Slope processes, Landscape development, United States—Colorado

51-1091

Soil weathering on glacial and glaciofluvial deposits in the Langtang Valley (central Nepal) and its relation to the glacial history.

Bäumler, R., et al, *Zeitschrift für Geomorphologie,* Apr. 1996, Vol.103(suppl.), p.373-387, With German and French summaries. 23 refs.

Glacial geology, Pleistocene, Paleoclimatology, Glacial deposits, Quaternary deposits, Moraines, Solifluction, Eolian soils, Weathering, Soil profiles, Soil formation, Radioactive age determination, Geochronology, Soil classification, Nepal

51-1092

Upper Cretaceous dinoflagellate cyst stratigraphy, onshore West Greenland.

Nøhr-Hansen, H., *Denmark. Grønlands geologiske undersøgelse. Bulletin,* 1996, No.170, 104p. + enclos., Refs. p.36-39.

Geological surveys, Subpolar regions, Palynology, Paleobotany, Marine deposits, Classifications, Quaternary deposits, Pleistocene, Sediments, Stratigraphy, Drill core analysis, Geochronology, Microscope slides, Greenland

51-1093

Palimpsest glacial dispersal trains and their significance for drift prospecting.

Parent, M., Paradis, S.J., Doiron, A., *Journal of geochemical exploration,* Oct. 1996, 56(2), p.123-140, Refs. p.138-140.

Glacial geology, Pleistocene, Quaternary deposits, Glacial deposits, Glacier flow, Sediment transport, Subglacial observations, Dispersions, Glacial erosion, Geochemistry, Lithology, Sampling

51-1094

Mathematical modeling of the heat-exchange process in a quarry bench in permanently frozen rock.

Polubelova, T.N., Sleptsov, V.I., Izakson, V.IU., *Journal of mining science,* Sep. 1996, 32(3), p.197-204, Translated from Fiziko-tekhnicheskie problemy razrabotki poleznykh iskopaemykh. 8 refs.

Quarries, Mining, Rock excavation, Thermal insulation, Covering, Frozen rock strength, Frozen rock temperature, Thaw weakening, Permafrost, Heat transfer, Heat sinks, Slope orientation, Insolation, Mathematical models

51-1095

Cryogeotechnology of metals (premises and theory).

Ptitsin, A.B., Tolkunov, B.L., Naumov, A.A., *Journal of mining science,* Sep. 1996, 32(3), p.224-239, Translated from Fiziko-tekhnicheskie problemy razrabotki poleznykh iskopaemykh. 30 refs.

Mining, Solutions, Freezing points, Geocryology, Permafrost bases, Frozen ground chemistry, Metals, Leaching, Capillarity, Temperature effects, Low temperature tests

51-1096

Approach to annual water balance for small mountainous catchments with wide spatial distributions of rainfall and snow water equivalent.

Tani, M., *Journal of hydrology,* Sep. 1996, 183(3-4), p.205-225, 34 refs.

Watersheds, Snow hydrology, Hydrologic cycle, Water balance, Runoff, Seasonal variations, Precipitation (meteorology), Evapotranspiration, Snow water equivalent, Correlation, Statistical analysis

51-1097

Comparison of slam-freezing and high-pressure freezing effects on the DNA cholesteric liquid crystalline structure.

Leforestier, A., Richter, K., Livolant, F., Dubochet, J., *Journal of microscopy,* Oct. 1996, 184(pt.1), p.4-13, 31 refs.

Cryobiology, Microscope slides, Laboratory techniques, Solutions, Freezing, Molecular structure, Ice microstructure, Electron microscopy, Vitreous ice, Cryogenics, Preserving

51-1098

Convection in a melt pond.

Bogorodskiĭ, P.V., Symposium on Boundary Layers and Turbulence, 11th, Charlotte, NC, Mar. 27-31, 1995, Boston, American Meteorological Society, 1995, p.72-75, 10 refs.

Oceanography, Sea ice, Ice melting, Ponds, Ice water interface, Convection, Thermal conductivity, Salinity, Air ice water interaction, Mathematical models, Thermodynamic properties

51-1099

New formulation for the Bowen ratio over saturated surfaces.

Cash, B.A., Andreas, E.L., MP 3916, Symposium on Boundary Layers and Turbulence, 11th, Charlotte, NC, Mar. 27-31, 1995, Boston, American Meteorological Society, 1995, p.110-113, 20 refs. For another version see 50-6570.

Turbulent boundary layer, Marine meteorology, Heat flux, Vapor pressure, Water vapor, Saturation, Ice air interface, Surface temperature, Indexes (ratios), Thermodynamic properties

In this paper the authors formulate new expressions for the Bowen ratio (Bo) in terms of Bo_* for the cases in which sensible heat (H_s) and latent heat (H_L) are both positive or both negative and show that Bo_* is an important parameter when H_s is negative and H_L is positive. These formulations are based on 17 tabulations of H_s, H_L, and surface temperature (T_s) taken from data sets that came from over-water experiments in the open ocean, the marginal seas, and the Great Lakes and from over-snow experiments on sea ice and frozen ground. T_s ranged from -41° to 28°C. The analysis yields one functional form for Bo versus Bo_* that spans this entire temperature range for each of the three cases given, unifying the prediction of Bo over any saturated surface, provided the signs of H_s and H_L are known a priori.

51-1100

Atmospheric convection from arctic leads.

Alam, A., Curry, J.A., Symposium on Boundary Layers and Turbulence, 11th, Charlotte, NC, Mar. 27-31, 1995, Boston, American Meteorological Society, 1995, p.421-423, 7 refs.

Oceanography, Atmospheric boundary layer, Marine meteorology, Ice openings, Sea ice distribution, Heat flux, Turbulent flow, Thermal diffusion, Air ice water interaction, Convection, Mathematical models, Buoyancy

51-1101

Review of Cretaceous and Tertiary stratigraphy in the northern Yukon and adjacent Northwest Territories.

Dixon, J., *Canada. Geological Survey. Paper,* 1992, 92-9, 79p. + maps, With French summary. Refs. p.72-79.

Pleistocene, Subarctic landscapes, Geological surveys, Geologic structures, Sedimentation, Stratigraphy, Tectonics, Lithology, Correlation, Canada—Yukon Territory, Canada—Northwest Territories

51-1102

Grid based distributed hydrologic model: testing against data from Reynolds Creek experimental watershed.

Tarboton, D.G., Jackson, T.H., Liu, J.Z., Neale, C.M.U., Cooley, K.R., McDonnell, J.J., Conference on Hydrology, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.79-84, WDCA 95000124, 13 refs.

Snow hydrology, Snowmelt, Runoff forecasting, Stream flow, Water balance, Watersheds, Computerized simulation, United States—Idaho

51-1103

Stable isotope tracing as a tool for testing assumptions in a grid based distributed hydrologic model.

Unnikrishna, P.V., McDonnell, J.J., Tarboton, D.G., Kendall, C., Flerchinger, G.N., Conference on Hydrology, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.85-90, WDCA 95000124, 11 refs.

Snow hydrology, Snowmelt, Runoff forecasting, Stream flow, Water balance, Watersheds, Isotopic labeling, Computerized simulation, United States—Idaho

51-1104

Influence of river discharge upon ice conditions in arctic seas.

Appel', I.L., Gudkovich, Z.M., Conference on Hydrology, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.192-193, WDCA 95000124.

Sea ice distribution, Ice conditions, Ice water interface, River flow, Water transport, Russia—Siberia

51-1105

Interactive digital forecast preparation using slider bars.

Mosher, F.R., International Conference on Interactive Information and Processing Systems for Meteorology, Oceanography, and Hydrology, 11th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.46-49, WDCA 95000142, 1 ref.

Aircraft icing, Ice forecasting, Weather forecasting, Data processing, Data transmission, Computer applications

51-1106

New radiosonde temperature sensor with fast response time and small radiation error.

Turtiainen, H., Tammela, S., Stuns, I., International Conference on Interactive Information and Processing Systems for Meteorology, Oceanography, and Hydrology, 11th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.98-102, WDCA 95000142.

Air temperature, Temperature measurement, Weather forecasting, Meteorological instruments, Airborne equipment, Sounding

51-1107

Sensor heating to enhance reliability of radiosonde humidity measurement.

Paukkunen, A., International Conference on Interactive Information and Processing Systems for Meteorology, Oceanography, and Hydrology, 11th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.103-107, WDCA 95000142, 4 refs.

Humidity, Hygrometers, Weather forecasting, Meteorological instruments, Airborne equipment, Sounding, Low temperature tests

51-1108

Antarctic data archive and access system.

Bywaters, K.W., Lazzara, M., Santek, D., Young, J.T., International Conference on Interactive Information and Processing Systems for Meteorology, Oceanography, and Hydrology, 11th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.373-375, WDCA 95000142, 2 refs.

Data processing, Data transmission, Computer applications, Spaceborne photography

With ever increasing volumes of satellite data available to scientists, it is becoming increasingly difficult for them to gain control of the dataset. Surprisingly, antarctic research exemplifies this problem well. Even though Antarctica has a low density of surface based observations, it is by definition, an area of high temporal and spatial coverage by polar orbiting satellites. The AMRC (Antarctic Meteorological Research Center) at SSEC (Space Science and Engineering Center) has developed a tool that logically stores the data and provides the scientist with the capability to search the database for a specified subset meeting predefined criteria. It is built on top of the Empress RDBMS (Relational DataBase Management System). Satellite data from NOAA-10, -11 and -12 are stored in the database and a convenient graphical interface provides easy point-and-click access to the system. (Auth. mod.)

51-1109

Icelandic waterworks. *Science,* Nov. 15, 1996, 274(5290), p.1085, For a related article see 51-1112.

Earthquakes, Glacier melting, Flooding, Volcanoes, Iceland

51-1110

Synchronized terrestrial-atmospheric deglacial records around the North Atlantic.

Björck, S., et al, *Science,* Nov. 15, 1996, 274(5290), p.1155-1160, 85 refs.

Ice cores, Ice dating, Geochemistry, Atmospheric composition, Carbon isotopes, Ice cores, North Atlantic Ocean

51-1111

Human influence on the atmospheric vertical temperature structure: detection and observation.

Tett, S.F.B., Mitchell, J.F.B., Parker, D.E., Allen, M.R., *Science,* Nov. 15, 1996, 274(5290), p.1170-1173, 24 refs.

Air temperature, Atmospheric composition, Climatic changes, Ozone, Aerosols, Models, Measuring instruments, Radiosondes

Recent work suggests a discernible human influence on climate. This finding is supported, with less restrictive assumptions than those used in earlier studies, by a 1961 through 1995 data set of radiosonde observations and by ensembles of coupled atmosphere-ocean simulations forced with changes in greenhouse gases, tropospheric sulfate aerosols, and stratospheric ozone. On balance, agreement between the simulations and observations is best for a combination of greenhouse gas, aerosol, and ozone forcing. The uncertainties remaining are due to imperfect knowledge of radiative forcing, natural climate variability, and errors in observations and model response. The range of instrumental measurements extends globally from 90°N to 90°S. (Auth. mod.)

51-1112

Volcanoes under ice: recipe for a flood.

Monastersky, R., *Science news,* Nov. 23, 1996, 150(21), p.327, For a related article see 51-1109.

Volcanoes, Water flow, Ice cover, Subglacial drainage, Floods, Iceland

51-1113

Mother lode of natural gas.

Monastersky, R., *Science news,* Nov. 9, 1996, 150(19), p.298-299.

Permafrost, Hydrocarbons, Natural gas, Hydrates, Methane, Russia—Siberia, Canada—Northwest Territories, United States—Alaska

51-1114

Fennoscandian earthquakes: whole crustal rupturing related to postglacial rebound.

Arvidsson, R., *Science,* Nov. 1, 1996, 274(5288), p.744-746, 30 refs.

Earthquakes, Glacial geology, Ice melting, Norway, Sweden, Finland

51-1115

Climatic and hydrologic oscillations in the Owens Lake basin and adjacent Sierra Nevada, California.

Benson, L.V., Burdett, J.W., Kashgarian, M., Lund, S.P., Phillips, F.M., Rye, R.O., *Science,* Nov. 1, 1996, 274(5288), p.746-749, 29 refs.

Glaciation, Hydrology, Paleoclimatology, Icebergs, Oscillations, Periodic variations, United States—California—Owens Lake (Dry), United States—California—Sierra Nevada, North Atlantic Ocean

51-1116

Chronology for fluctuations in Late Pleistocene Sierra Nevada glaciers and lakes.

Phillips, F.M., Zreda, M.G., Benson, L.V., Plummer, M.A., Elmore, D., Sharma, P., *Science,* Nov. 1, 1996, 274(5288), p.749-751, 29 refs.

Geochronology, Oscillations, Mountain glaciers, Hydrology, Icebergs, United States—California—Sierra Nevada, United States—California—Owens Lake (Dry)

51-1117

Vascular plants as sensitive indicators of lead and PCB transport from local sources in the Canadian Arctic.

Dushenko, W.T., Grundy, S.L., Reimer, K.J., *Science of the total environment,* Sep. 20, 1996, 188(1), p.29-38, 32 refs.

Air pollution, Tundra vegetation, Subpolar regions, Atmospheric composition, Hydrocarbons, Aerosols, Plant physiology, Plant tissues, Soil composition, Sampling, Environmental impact, Environmental tests, Statistical analysis, Canada—Northwest Territories

51-1118

Intercomparison of total ozone data from a Dobson spectrophotometer, TOMS, visible wavelength spectrometer, and ozonesondes.

Nichol, S.E., Keys, J.G., Wood, S.W., Johnston, P.V., Bodeker, G.E., *Geophysical research letters,* May 15, 1996, 23(10), p.1087-1090, 15 refs.

Climatology, Polar atmospheres, Atmospheric composition, Stratosphere, Ozone, Radio echo soundings, Photometry, Spectroscopy, Correlation, Seasonal variations

Comparisons of total column ozone measurements from three ground-based instruments (Dobson spectrophotometer, ozonesonde, and visible wavelength grating spectrometer) and the TOMS instrument are presented for the period 1991 to 1994 at Arrival Heights, McMurdo. The primary purpose of these comparisons is to investigate the accuracy of the visible spectrometer, while a second aim is to compare version 6 and version 7 TOMS satellite retrievals with the ground-based measurements. While the Dobson, TOMS and ozonesonde measurements show good agreement, there is a seasonal dependence between data from the visible wavelength spectrometer and each of the other three instruments. However, the visible spectrometer produces valuable data for the late autumn and early spring, when data are not available from the Dobson and TOMS. (Auth. mod.)

51-1119

Balloonborne backscatter observations of type 1 PSC formation: inference about physical state from trajectory analysis.

Larsen, N., Knudsen, B.M., Rosen, J.M., Kjome, N.T., Kyrö, E., *Geophysical research letters,* May 15, 1996, 23(10), p.1091-1094, 19 refs.

Climatology, Polar atmospheres, Cloud physics, Polar stratospheric clouds, Radio echo soundings, Backscattering, Aerosols, Heterogeneous nucleation, Freezing points, Ice vapor interface, Solid phases, Statistical analysis

51-1120

Recent climate anomalies and their impact on snow chemistry at South Pole, 1987-1994.

Dibb, J.E., Whitlow, S.I., *Geophysical research letters,* May 15, 1996, 23(10), p.1115-1118, 14 refs.

Climatology, Polar atmospheres, Stratosphere, Atmospheric composition, Degradation, Aerosols, Ozone, Volcanic ash, Firn, Snow impurities, Sampling, Correlation, Antarctica—Amundsen-Scott Station

Three 2 m deep snowpits sampled at South Pole in 1994 provide detailed (2 cm resolution) profiles of the concentrations of soluble ionic species for the period 1987-1994. The most prominent feature is a large concentration spike of $SO_4^=$ in snow deposited in 1992 reflecting fallout from the eruptions of Pinatubo and Hudson in 1991. The overlapping effects of the volcanic eruptions and El Nino circulation preclude partitioning the enhanced deposition of $SO_4^=$ into volcanic and biogenic fractions. Nitrate concentration profiles show no relation to the severity of O_3 depletion in the antarctic stratosphere during the period of record. Rather, the profiles show a progressive decline of the annual peak concentrations over the top 0.5-1.0 m of each pit. This behavior is attributed to post-deposition loss of NO_3^-, presumably by re-emission of HNO_3 into the atmosphere. (Auth. mod.)

51-1121

New inferences of mantle viscosity from joint inversion of long-wavelength mantle convection and post-glacial rebound data.

Forte, A.M., Mitrovica, J.X., *Geophysical research letters,* May 15, 1996, 23(10), p.1147-1150, 18 refs.

Tectonics, Pleistocene, Earth crust, Viscoelasticity, Profiles, Glacial geology, Ice loads, Isostasy, Statistical analysis, Rheology, Gravity anomalies

51-1122

Isotopic signature of debris-rich ice formed by regelation into a subglacial sediment bed.

Iverson, N.R., Souchez, R., *Geophysical research letters,* May 15, 1996, 23(10), p.1151-1154, 20 refs.

Glacial geology, Glacier beds, Bottom ice, Sediment transport, Ice solid interface, Regelation, Interstitial ice, Ice composition, Oxygen isotopes, Isotope analysis, Simulation

51-1123

Dispersion of regional body waves at 100-150 km depth beneath Alaska: in situ constraints on metamorphism of subducted crust.

Abers, G.A., Sarker, G., *Geophysical research letters,* May 15, 1996, 23(10), p.1171-1174, 23 refs.

Marine geology, Earth crust, Tectonics, Seismic refraction, Wave propagation, Seismic velocity, Geologic structures, Structural analysis, Geophysical surveys, United States—Alaska

51-1124

Radar cross-section measurements of snow and ice for design of SEV pilotage system.

U.S. Army Cold Regions Research and Engineering Laboratory, MP 3921, *U.S. Army Cold Regions Research and Engineering Laboratory,* June 1971, 84p., ARPA No.1615, 5 refs.

Air cushion vehicles, Ice navigation, Ice detection, Sea clutter, Falling snow, Ice dielectrics, Snow cover effect, Profiles, Radar echoes, Backscattering, Sensors, Design criteria, Performance, Polarization (waves), Antennas

In the Advanced Research Projects Agency (ARPA) program to develop a surface effect vehicle (SEV) for use in the Arctic, serious consideration is being given to the pilotage of the vehicle, particularly to the problem of the avoidance of pressure ridges on the sea ice. In bad weather conditions, a radar system is needed for reliable detection, because radar can penetrate snow and fog. For the design of this radar, the following environmental parameters are required to optimize the system: the terrain clutter from snow and ice surfaces at low grazing angles at various frequencies and the radar cross section of ice and snow objects. A test program was designed to measure these parameters. The radar frequencies 10, 35, and 95 GHz were chosen because of their availability. The tests were performed on a frozen snow-covered lake at Lyme, NH, 10 miles north of USA CRREL. The tests were conducted from Jan. 10, 1971 to Mar. 15, 1971. The site was snow covered during the entire testing period.

51-1125

Determination of the acoustic properties of frozen soils.

Nakano, Y., Smith, M., Martin, R., Stevens, H., Knuth, K., MP 3917, *U.S. Army Cold Regions Research and Engineering Laboratory,* May 1971, 72p., ARPA No.1525, Refs. passim.

Frozen ground physics, Acoustic measurement, Wave propagation, Sound transmission, Velocity measurement, Ultrasonic tests, Viscoelasticity, Resonance, Oscillations, Statistical analysis, Simulation

The acoustic properties of frozen earth materials were investigated. The study consists of four different efforts described in four sections. In the first part the velocities of dilatational waves were measured with the pulse first-arrival technique. In the second part a linear viscoelastic constitutive equation was obtained by the use of the resonance column technique. In the third part the method of free oscillation of spherical specimens was developed. In the last part the acoustic properties were determined by the use of a critical angle tank.

51-1126

Report to the International Niagara Board of Control on the 1994-1995 operation of the Lake Erie-Niagara River ice boom.

International Niagara Working Committee, Sep. 1995, 35p. + figs.

River ice, River flow, Channels (waterways), Ice control, Ice booms, Water temperature, Air temperature, Ice forecasting, Ice navigation, Performance, United States—New York—Buffalo, Canada—Saint Lawrence River

51-1127

Deposition of organic carbon in Arctic Ocean sediments: terrigenous supply vs marine productivity.

Schubert, C.J., Stein, R., *Organic geochemistry,* Apr. 1996, 24(4), International Meeting on Organic Geochemistry, 17th, Donostia-San Sebastian, Spain, Sep.4-8, 1995. Proceedings. Part 1—Palaeoclimate and palaeoceanography, p.421-436, Refs. p.434-436.

Oceanographic surveys, Geochemical cycles, Organic nuclei, Sampling, Sea ice distribution, Ice cover effect, Ice rafting, Bottom sediment, Biomass, Sedimentation, Drill core analysis, Arctic Ocean

51-1128

Compositional variations in sedimentary lacustrine organic matter and their implications for high alpine Holocene environmental changes: Lake St. Moritz, Switzerland.

Ariztegui, D., Farrimond, P., McKenzie, J.A., *Organic geochemistry,* Apr. 1996, 24(4), International Meeting on Organic Geochemistry, 17th, Donostia-San Sebastian, Spain, Sep.4-8, 1995. Proceedings. Part 1—Palaeoclimate and palaeoceanography, p.453-461, 27 refs.

Paleoclimatology, Climatic changes, Alpine landscapes, Lacustrine deposits, Geochemical cycles, Sedimentation, Biomass, Stratigraphy, Organic nuclei, Drill core analysis, Isotope analysis, Lithology, Switzerland—Alps

51-1129

Distribution of recent benthic foraminifera in a subarctic fjord-delta: Tana, Norway.

Corner, G.D., Stinsund, P.I., Aspeli, R., *Marine geology,* Sep. 1996, 134(1-2), p.113-125, 33 refs.

Marine geology, Marine biology, Biomass, Ecosystems, Bottom sediment, Sedimentation, Estuaries, Deltas, Subpolar regions, Sampling, Classifications, Distribution, Norway

51-1130

930-year ring-width chronology from moisture-sensitive white spruce (*Picea glauca* Moench) in northwestern Canada.

Szeicz, J.M., MacDonald, G.M., *Holocene,* Sep. 1996, 6(3), p.345-351, 27 refs.

Climatology, Subarctic landscapes, Climatic changes, Trees (plants), Plant tissues, Age determination, Growth, Stresses, Moisture transfer, Hydrology, Sampling, Geochronology, Statistical analysis, Canada—Northwest Territories

51-1131

Late-Holocene glacier variations in the Cordillera Darwin, Tierra del Fuego, Chile.

Kuylenstierna, J.L., Rosqvist, G.C., Holmlund, P., *Holocene,* Sep. 1996, 6(3), p.353-358, 33 refs.

Climatology, Paleoecology, Glacial geology, Glacier oscillation, Climatic changes, Glacial deposits, Stratigraphy, Radioactive age determination, Correlation, Chile—Tierra del Fuego

51-1132

On solar forcing of Holocene climate: evidence from Scandinavia.

Karlén, W., Kuylenstierna, J.L., *Holocene,* Sep. 1996, 6(3), p.359-365, Refs. p.364-365.

Pleistocene, Paleoclimatology, Climatic changes, Insolation, Paleoecology, Glacial deposits, Glacier oscillation, Quaternary deposits, Carbon isotopes, Radioactive age determination, Geochronology, Correlation, Periodic variations, Sweden

51-1133

Lake sediment studies of Holocene glacial activity in the Kårsa valley, northern Sweden: contrasts in interpretation.

Snowball, I., Sandgren, P., *Holocene,* Sep. 1996, 6(3), p.367-372, 29 refs.

Glacial geology, Glacier oscillation, Lacustrine deposits, Climatic changes, Paleoecology, Stratigraphy, Drill core analysis, Particle size distribution, Sampling, Geochemical cycles, Radioactive age determination, Correlation, Sweden—Kårsa

51-1134

Deicers complying with strict limits. *Public works,* Nov. 1996, 127(12), p.62.

Road icing, Corrosion, Salting, Chemical properties, Ice removal, Environmental impact, Environmental protection, Specifications

51-1135

Organic geochemistry and geohistory of the Triassic succession of Bjørnøya, Barents Sea.

Isaksen, G.H., *Organic geochemistry,* Mar. 1996, 24(3), p.333-349, 58 refs.

Marine geology, Pleistocene, Geochemical cycles, Marine deposits, Sedimentation, Sampling, Exploration, Lithology, Stratigraphy, Thin sections, Hydrocarbons, Bitumens, Geochronology, Barents Sea, Norway—Svalbard

51-1136

Structural relaxations in amorphous water studied by hole-burning spectroscopy.

Giering, T., Haarer, D., *Chemical physics letters,* Nov. 1, 1996, 261(6), p.677-684, 33 refs.

Ice physics, Amorphous ice, Molecular structure, Water structure, Infrared spectroscopy, Ice spectroscopy, Hydrogen bonds, Radiation absorption, Low temperature tests, Condensation, Cryogenics, Spectra

51-1137

Abscisic acid analog inhibits abscisic acid-induced freezing tolerance and protein accumulation, but not abscisic acid-induced sucrose uptake in a bromegrass (*Bromus inermis* Leyss) cell culture.

Wilen, R.W., Fu, P., Robertson, A.J., Abrams, S.R., How, N.H., Gusta, L.V., *Planta,* Sep. 1996, 200(1), p.138-143, 25 refs.

Plant physiology, Grasses, Frost resistance, Acclimatization, Plant tissues, Solutions, Temperature effects, Chemical properties, Molecular structure, Cryobiology

51-1138

Two long sedimentary records from Jersey, Channel Islands: stratigraphic and pedological evidence for environmental change during the last 200 kyr.

Keen, D.H., Van Vliet-Lanoe, B., Lautridou, J.P., *Quaternaire,* 1996, 7(1), p.3-13, With French summary. 29 refs.

Pleistocene, Paleoclimatology, Climatic changes, Shores, Marine geology, Marine deposits, Loess, Quaternary deposits, Stratigraphy, Lithology, Correlation, United Kingdom—Jersey

51-1139

Comment on 'Formation mechanisms of side branches of dendritic ice crystals grown from vapor by T. Gonda and H. Nakahara' [J. Crystal Growth 160 (1996)].

Nelson, J., *Journal of crystal growth,* Oct. 1996, 167(3-4), p.782, 7 refs. For pertinent paper see 50-5193.

Ice physics, Ice crystal growth, Ice solid interface, Ice crystal structure, Dendritic ice, Supersaturation, Substrates

51-1140

Orientational defects on a hydrogen-bonded chain.

Mittal, R., Howard, I.A., *Physical review B,* June 1, 1996, 52(21), p.14,171-14,178, 24 refs.

Ice physics, Molecular structure, Orientation, Hydrogen bonds, Defects, Charge transfer, Proton transport, Electric fields, Ice models, Mathematical models

51-1141

Lilloise intrusion, East Greenland: fractionation of a hydrous alkali picritic magma.

Chambers, A.D., Brown, P.E., *Journal of petrology,* Aug. 1995, 36(4), p.933-963, Refs. p. 961-963.

Tectonics, Pleistocene, Subpolar regions, Magma, Geologic processes, Stratification, Rock properties, Subsidence, Geochemistry, Geomorphology, Greenland

51-1142

Microwave surface backscattering and surface roughness of Baltic Sea ice.

Manninen, A.T., *Finnish marine research,* 1996, No.265, 39p. + appends., Ph.D. thesis to be defended at the Helsinki University of Technology. Refs. p.32-37.

Ice surveys, Ice forecasting, Ice deformation, Ice surface, Pressure ridges, Spaceborne photography, Synthetic aperture radar, Backscattering, Image processing, Statistical analysis, Mathematical models, Baltic Sea

51-1143

SHRP/LTPP 1987-1992: report from the Swedish group reviewing the LTPP within SHRP. [SHRP/LTPP 1987-1992: rapport från den svenska bevakninsgruppen]

Wiman, L.G., ed, *Sweden. Statens väg- och transportforskningsinstitut. VTI meddelande,* 1996, No.786, 114p., In Swedish with summary, tables, figures, and some section headings in English. 10 refs.

Bituminous concretes, Concrete pavements, Cold weather performance, Fatigue (materials), Trafficability, Road maintenance, Research projects

51-1144

Environmental effects of highway runoff water: a literature review.

Folkeson, L., *Swedish National Road and Transport Research Institute (Statens väg- och transportforskningsinstitut). VTI rapport,* 1994, 391A, 62p., 156 refs. For Swedish original see 48-4021.

Salting, Snowmelt, Runoff, Soil pollution, Water pollution, Road maintenance, Environmental impact, Sweden

51-1145

Atlas of precipitation extremes for the northeastern United States and southeastern Canada.

Wilks, D.S., Cember, R.P., *Cornell University. Northeast Regional Climate Center. Research series. Publication,* Sep. 1993, RR 93-5, 40p., 10 refs.

Precipitation (meteorology), Records (extremes), Flood forecasting, Weather stations, Meteorological charts, Meteorological data, Statistical analysis

51-1146

Atlas of extreme snow water-equivalent for the northeastern United States.

Wilks, D.S., McKay, M., *Cornell University. Northeast Regional Climate Center. Research series. Publication,* Nov. 1994, RR 94-3, 20p., 11 refs.

Snowstorms, Snowfall, Snow water equivalent, Records (extremes), Weather stations, Meteorological charts, Meteorological data, Statistical analysis

51-1147

Atlas of short-duration precipitation extremes for the northeastern United States and southeastern Canada.

McKay, M., Wilks, D.S., *Cornell University. Northeast Regional Climate Center. Research series. Publication,* Mar. 1995, RR 95-1, 26p., 2 refs.

Precipitation (meteorology), Records (extremes), Flood forecasting, Meteorological charts, Meteorological data, Statistical analysis

51-1148

Methodology for updating a conceptual snow model with snow measurements.

Day, G.N., *U.S. National Oceanic and Atmospheric Administration. National Weather Service. NOAA technical report,* Mar. 1990, NWS 43, 133p., Refs. p.125-133. For Ph.D. thesis of same title see 45-509.

Snow surveys, Snow cover distribution, Snow hydrology, Snowmelt, Snow water equivalent, Stream flow, Runoff forecasting, Statistical analysis, Mathematical models

51-1149

Polynomial and power functions for glacial valley cross-section morphology.

James, L.A., *Earth surface processes and landforms,* May 1996, 21(5), p.413-432, 24 refs.

Glacial geology, Geomorphology, Glacial erosion, Geological surveys, Valleys, Profiles, Bedrock, Topographic features, Mathematical models, Statistical analysis

51-1150

Microfabric evidence for podzolic soil inversion by solifluction processes.

Elliott, G., *Earth surface processes and landforms,* May 1996, 21(5), p.467-476, 20 refs.

Alpine landscapes, Sedimentation, Podsol, Cryogenic soils, Periglacial processes, Solifluction, Soil structure, Microstructure, Sampling, Thin sections, Stratigraphy, Thaw consolidation

51-1151

Observation of negative ion resonances in amorphous ice via low-energy (5-40eV) electron-stimulated production of molecular hydrogen.

Kimmel, G.A., Orlando, T.M., *Physical review letters,* Nov. 4, 1996, 77(19), p.3983-3986, 24 refs.

Ice physics, Amorphous ice, Lasers, Radiation absorption, Ice spectroscopy, Ionization, Hydrogen, Resonance, Ions, Molecular energy levels, Vibration, Scattering

51-1152

Analysis of soil and pine-needle data from northern terrestrial ecosystems.

Peresedov, V.F., Chinaeva, V.P., Gundorina, S.F., Ostrovnaia, T.M., *Journal of radioanalytical and nuclear chemistry—articles,* July 1996, 207(2), p.295-302, 6 refs.

Forest ecosystems, Climatology, Air pollution, Soil pollution, Subpolar regions, Aerosols, Plant tissues, Environmental tests, Metals, Mining, Sampling, Spectroscopy, Gamma irradiation

51-1153

Reconnaissance and preliminary interpretation of Upper Devonian to Permian stratigraphy of northeastern Ellesmere Island, Canadian Arctic archipelago.

Mayr, U., *Canada. Geological Survey. Paper,* 1992, 91-08, 117p. + maps, With French summary. 26 refs.

Arctic landscapes, Pleistocene, Geomorphology, Tectonics, Marine geology, Geological surveys, Geologic processes, Stratigraphy, Rock properties, Geological maps, Canada—Northwest Territories—Ellesmere Island

51-1154

Active layer distortion of annual air/soil thermal orbits.

Beltrami, H., *Permafrost and periglacial processes,* Apr.-June 1996, 7(2), p.101-110, With French summary. 21 refs.

Soil physics, Soil temperature, Air temperature, Temperature variations, Snow cover effect, Soil air interface, Active layer, Heat transfer, Thermal regime, Mathematical models, Correlation, Seasonal variations

51-1155

Effects of nivation on periglacial landscape evolution in western Jutland, Denmark.

Christiansen, H.H., *Permafrost and periglacial processes,* Apr.-June 1996, 7(2), p.111-138, With French summary. 47 refs.

Geomorphology, Landscape development, Landscape types, Periglacial processes, Nivation, Snow cover effect, Sediment transport, Soil profiles, Geochronology, Luminescence, Denmark—Jutland

51-1156

Soil moisture variability in relation to diurnal frost heaving on Japanese high mountain slopes.

Matsuoka, N., *Permafrost and periglacial processes,* Apr.-June 1996, 7(2), p.139-151, With French summary. 25 refs.

Alpine landscapes, Mountain soils, Periglacial processes, Soil temperature, Seasonal freeze thaw, Freeze thaw cycles, Frost heave, Soil creep, Slope processes, Soil water migration, Moisture transfer, Diurnal variations, Japan

51-1157

Near-surface brecciation of chalk, Isle of Thanet, south-east England: a comparison with ice-rich brecciated bedrocks in Canada and Spitsbergen.

Murton, J.B., *Permafrost and periglacial processes,* Apr.-June 1996, 7(2), p.153-164, With French summary. 43 refs.

Periglacial processes, Bedrock, Geomorphology, Soil formation, Permafrost transformation, Ground ice, Cryogenic soils, Thaw consolidation, Stratigraphy, Cryoturbation, United Kingdom—Thanet, Isle

51-1158

Pleistocene permafrost of West Siberia as a deformable glacier bed.

Astakhov, V.I., Kaplianskaia, F.A., Tarnogradskiĭ, V.D., *Permafrost and periglacial processes,* Apr.-June 1996, 7(2), p.165-191, With French summary. Refs. p.189-191.

Pleistocene, Glacial geology, Permafrost structure, Glacier beds, Deformation, Tectonics, Glacial erosion, Ground ice, Ice veins, Sediment transport, Stratification, Soil formation, Russia—Siberia

51-1159

Surficial characteristics associated with the occurrence of permafrost near Mayo, central Yukon Territory, Canada.

Williams, D.J., Burn, C.R., *Permafrost and periglacial processes,* Apr.-June 1996, 7(2), p.193-206, With French summary. 40 refs.

Discontinuous permafrost, Permafrost indicators, Soil surveys, Classifications, Soil tests, Soil mapping, Hummocks, Soil water, Correlation, Permafrost forecasting, Topographic effects, Canada—Yukon Territory—Mayo

51-1160

Preprints.

Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995, Boston, American Meteorological Society, 1995, 279p. + joint papers, WDCA 95000250, Refs. passim. For individual papers see 51-1161 through 51-1237 or F-56217 through F-56219, F-56227, F-56239, I-56213 through I-56216, I-56220 through I-56226, I-56228, I-56230 through I-56238, I-56240 through I-56246 and J-56229.

Polar atmospheres, Marine atmospheres, Atmospheric circulation, Air ice water interaction, Ice heat flux, Sea ice distribution, Cloud cover, Wind (meteorology), Air temperature, Surface temperature, Ocean currents, Radiation balance, Global warming

This preprint volume contains the papers accepted for presentation at the 4th Conference on Polar Meteorology and Oceanography held in Dallas, TX, Jan. 15-20, 1995. The conference brought together scientists from a variety of specializations in the atmospheric and oceanic sciences, with a common interest in the phenomena and processes that occur in high latitudes. The papers deal with all topics of interest in polar meteorology and oceanography, with special emphases on polar clouds and on climate change in the polar regions. These emphases were motivated by recent climate model results that highlight the polar regions as particularly sensitive to climate change, while at the same time the polar climate is particularly difficult to model and to remotely sense from satellites.

51-1161

Preliminary design for arctic atmospheric radiative transfer experiments.

Zak, B.D., et al, Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.1-3, 3 refs.

Polar atmospheres, Marine atmospheres, Atmospheric circulation, Cloud cover, Radiation balance, Radiometry, Global warming

51-1162
Sedimentation and subsequent deposition of the Mt. Pinatubo aerosol over Antarctica based on SAGE II and ground truth measurements.
Anderson, J., Saxena, V.K., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.4-7, 19 refs.
Polar atmospheres, Stratosphere, Atmospheric composition, Atmospheric circulation, Aerosols, Volcanic ash, Scavenging, Ice cores, Antarctica
This study focuses on changes in the microphysical and columnar properties and the stratospheric settling of the Pinatubo aerosol in a unit column between 15-25 km in the antarctic region. The temporal periods of this study are during the austral springs and summers between 1991-94 derived from the Stratospheric Aerosol and Gas Experiment (SAGE) II remotely sensed measurements. Ground truth measurements in the form of chemical analysis of a 1.8 m deep snow/ice core, collected from the Marr Ice Piedmont on Palmer Peninsula, are presently underway.

51-1163
Twenty-year aerosol record at South Pole.
Hogan, A.W., Bodhaine, B.A., MP 3918, Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.8-12, 11 refs.
Polar atmospheres, Atmospheric composition, Aerosols, Statistical analysis, Antarctica—Amundsen-Scott Station
A Nolan-Pollak photoelectric nucleus counter was installed in the auroral observatory at South Pole on Jan. 26, 1974. It was moved to an interim observatory near the domed Amundsen-Scott Station in Jan. 1975, and to the clean air facility predominantly upwind of station activities in Jan. 1977. This instrument is used as an on-site standard to calibrate automatic or recording aerosol detectors, and is also used to measure the ambient aerosol concentration twice daily. This paper presents a comparison of the 20-year aerosol record with those published at five and ten years of observation. It also presents a statistical analysis of the record.

51-1164
Climatology of surface, tropospheric and stratospheric temperatures in the arctic from a new TOVS dataset.
Khalsa, S.J.S., Key, J.R., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.13-18, 9 refs.
Polar atmospheres, Air temperature, Spaceborne photography, Meteorological data, Climatic changes, Global warming, Statistical analysis

51-1165
Antarctic inversion.
Connolley, W.M., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.19-21, 4 refs.
Polar atmospheres, Atmospheric circulation, Air temperature, Temperature inversions, Statistical analysis, Antarctica
The strongest and most persistent temperature inversion in the world occurs over the interior of Antarctica in winter. At Vostok Station the average surface inversion for the six months May to Oct. is 25°C. An accurate picture of the inversion is hard to obtain because there are few radiosonde stations in Antarctica. By using the full output from the UK Meteorological Office Global Climate Model, the author can obtain a complete map of the (model) inversion, surface and upper-air temperatures and can therefore test empirical relations between these variables. A restricted set of output, surface temperature only, is then used to generate maps of the inversion using the P&Z and regression methods, which he compares to the model inversion. He shows that both methods describe the modelled inversion strength quite well, with a standard deviation of error over the continent of about 2.5°C.

51-1166
Radiosonde temperature profiles at South Pole: correction for thermal lag.
Mahesh, A., Warren, S.G., Walden, V.P., Hughes, K., Koney, R., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.22-23, 3 refs.
Polar atmospheres, Air temperature, Temperature inversions, Sounding, Antarctica—Amundsen-Scott Station
Very steep shallow temperature inversions occur during most of the year on the Antarctic Plateau. The radiosonde carried by a balloon rising at 4-5 m/s does not measure the inversion-layer temperatures accurately because the response time of its thermistor is several seconds. To quantify this error, the authors flew a radiosonde on a tethered kite at the Amundsen-Scott Station on 9 occasions in Aug. and Sep. of 1992, immediately prior to the routine launch of the same sonde on a balloon. A figure shows that the temperature difference between the kite and the balloon data is several degrees in the steep inversion layer, but then diminishes as the temperature changes more slowly, allowing the thermistor to respond adequately. Owing to the finite response time of the thermistor, the temperature reported by the radiosonde at a given altitude is a linear combination of the true atmospheric temperature at that and all previous heights.

51-1167
TOVS-derived estimates of horizontal energy fluxes into and within the arctic basin.
Francis, J.A., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.24-27, 7 refs.
Polar atmospheres, Atmospheric circulation, Air ice water interaction, Advection, Heat flux, Radiometry, Spaceborne photography

51-1168
Dynamical method for retrieving precipitation over Greenland from wind, temperature, and moisture fields, and initial results.
Chen, Q.S., Bromwich, D.H., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.28-31, 4 refs.
Polar atmospheres, Atmospheric circulation, Precipitation (meteorology), Ice sheets, Glacial meteorology, Weather forecasting, Mathematical models, Statistical analysis, Greenland

51-1169
Accuracies of satellite-derived cloud and surface parameters in the polar regions and their effect on radiative flux estimates.
Key, J.R., Stone, R.S., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.32-37, 14 refs.
Polar atmospheres, Cloud cover, Albedo, Radiation balance, Ice heat flux, Snow heat flux, Radiometry, Spaceborne photography

51-1170
Relationships between the arctic surface radiation budget and atmospheric circulation.
Key, J.R., Serreze, M.C., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.38-42, 15 refs.
Polar atmospheres, Atmospheric circulation, Radiation balance, Cloud cover, Weather stations, Meteorological data, Statistical analysis, Canada—Northwest Territories

51-1171
TOVS-derived estimates of downwelling longwave radiation fluxes over the Arctic Basin.
Francis, J.A., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.43-46, 24 refs.
Polar atmospheres, Marine atmospheres, Atmospheric circulation, Air ice water interaction, Ice heat flux, Cloud cover, Radiation balance, Radiometry, Spaceborne photography

51-1172
Simulated sea ice data.
Appel', I.L., Samuels, C.B., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.47-52.
Sea ice distribution, Ice conditions, Drift, Ice forecasting, Ice models, Computerized simulation

51-1173
National Ice Center: Navy, NOAA, USCG cooperation in global sea ice.
Warrenfeltz, L.L., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.53-56, 2 refs.
Ice surveys, Sea ice distribution, Ice conditions, Ice forecasting, Ice reporting, Ice routing, Organizations, International cooperation, Data processing
In 1994, the U.S. Coast Guard formally joined with Navy and NOAA to form the National Ice Center (NIC). The NIC's areas of responsibility encompass the sea ice-affected portions of the Arctic, Antarctic, Atlantic, Pacific, Baltic, the Great Lakes, Chesapeake Bay, and Delaware Bay. Their products cover spatial scales from global analyses and forecasts for the East Arctic, West Arctic, and Antarctic to specialized tactical support tailored for individual customers operating in or near the ice. Seven-day, thirty-day, and seasonal forecasts of ice edge positions are produced for planning purposes.

51-1174
Description and validation of long-range sea ice forecasting methods at the National Ice Center.
Benner, D.A., Nauman, S., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.57-62, 8 refs.
Ice surveys, Sea ice distribution, Ice conditions, Ice forecasting, Ice reporting, Ice routing, Organizations, Data processing, Antarctica—Ross Sea, Antarctica—McMurdo Sound
The National Ice Center (NIC) provides global sea ice, iceberg and Great Lakes ice information to U.S. military, government and commercial customers. Manpower and fiscal resources for the NIC are provided through a cooperative agreement between the Department of the Navy, NOAA and the U.S. Coast Guard. The NIC provides analog and digital ice guidance products in support of operations and climate research in the polar regions. Presented in this paper are descriptions of NIC seasonal sea ice forecasting products, procedures used in their production and the validation of past long-range ice forecasting skill.

51-1175
Surface temperature and lead heat fluxes from aircraft surveys during Leadex.
Lindsay, R.W., Jessup, A.T., Francis, J.A., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.63-68, 14 refs.
Ice surveys, Sea ice distribution, Pack ice, Ice openings, Ice heat flux, Ice formation, Ice water interface, Air ice water interaction, Surface temperature, Aerial surveys, Radiometry, Mathematical models, Beaufort Sea

51-1176
Observations and 1-D simulations of ice pack surface energy budgets during LeadEx92.
Persson, P.O.G., Ruffieux, D., Burk, S.D., Fairall, C.W., Wolfe, D.E., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.69-74, 12 refs.
Pack ice, Ice heat flux, Ice temperature, Surface temperature, Ice air interface, Polar atmospheres, Diurnal variations, Statistical analysis, Beaufort Sea

51-1177
Surface energy balance of arctic sea ice in winter.
Steffen, K., DeMaria, T., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.75-78, 6 refs.
Polar atmospheres, Radiation balance, Ice cover effect, Ice air interface, Ice heat flux, Canada—Northwest Territories—Barrow Strait

51-1178
Surface energy and water balance over an antarctic ice shelf in winter.
King, J.C., Anderson, P.S., Smith, M.C., Mobbs, S.D., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.79-81, 9 refs.
Polar atmospheres, Radiation balance, Ice shelves, Glacier heat balance, Glacier mass balance, Glacial meteorology, Ice air interface, Ice heat flux, Antarctica—Halley Station
The energy balance at the surface of the antarctic continent controls the strength of the surface temperature inversion, which, in turn, controls the low-level katabatic circulation over the ice sheets. Because of the difficulties of carrying out micrometeorological studies in Antarctica, few measurements have been made of the climatology of surface energy balance components. In this paper, the authors report measurements of the mean wintertime energy balance over an ice shelf. They also estimate the contributions of evaporation from the surface and from blowing snow to the surface mass balance at this site. The measurements were made at Halley Station between Mar. and Sep. 1991.

51-1179

Atmospheric conditions during snowmelt at Dye 2, Greenland.

Anderson, M.R., Rowe, C.M., George, K.L., Mote, T.L., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.82-85, 3 refs.

Polar atmospheres, Ice sheets, Glacial meteorology, Snow ice interface, Snow air interface, Snow melting, Snow heat flux, Surface temperature, Greenland

51-1180

In situ measurements of the surface temperature in the western Weddell Sea.

Claffey, K.J., Andreas, E.L., Makshtas, A.P., Ivanov, B.V., MP 3919, Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.86-90, 8 refs.

Polar atmospheres, Radiation balance, Surface temperature, Ice air interface, Ice heat flux, Drift stations, Temperature measurement, Radiometry, Radiation measuring instruments, Antarctica—Weddell Sea

On Ice Station Weddell (ISW) in 1992, the authors had the opportunity to compare typical Russian and American instruments used to measure the components of the radiation balance *in situ* over sea ice. Here, they focus especially on the emitted longwave flux, since this yields the surface temperature. The surface temperature, in turn, is one of the most important parameters of sea ice because it is remotely monitorable and because it is intimately related to the surface heat budget. The longwave flux and both the turbulent sensible and latent heat fluxes depend strongly on surface temperature. From the time series of ISW radiation components and surface temperatures, the authors use a new variation of the Bowen ratio method to estimate the time series of sensible and latent heat fluxes on ISW.

51-1181

Measuring snow accumulation on the Greenland Crest.

Stearns, C.R., Weidner, G.A., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.91-93, 2 refs.

Ice sheets, Snow ice interface, Snow accumulation, Snow depth, Snow stratigraphy, Weather stations, Greenland

51-1182

United States Interagency Arctic Buoy Program.

Kniskern, F.E., Appell, G.F., Long, E.C., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.94-99, 4 refs.

Drift stations, Weather stations, Drift, Ice air interface, Air temperature, Surface temperature, Meteorological data, Data processing, Research projects

51-1183

U.S. automatic weather station program in Antarctica and Greenland.

Stearns, C.R., Weidner, G.A., Holmes, R., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.100-102, 1 ref.

Polar atmospheres, Weather stations, Weather observations, Meteorological data, Data transmission, Research projects, Antarctica, Greenland

The National Science Foundation Office of Polar Programs automatic weather station project places automatic weather station (AWS) units in remote areas of Antarctica and Greenland in support of meteorological research and operations. Tables showing polar AWS locations for 1994, and AWS sites planned for installation in 1994-95 are presented. The Development of low power computer components in the 1970s and the ARGOS DCS on the NOAA series of polar orbiting satellites made possible the development of low-power AWS units capable of operating in the extreme polar climates.

51-1184

Polar data sets from the Defense Meteorological Satellite Program (DMSP) digital data archive.

Scharfen, G.R., Knowles, K.W., Bauer, R.J., Swick, R.S., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.103-107, 16 refs.

Ice surveys, Sea ice distribution, Snow cover distribution, Polar atmospheres, Cloud cover, Oceanographic surveys, Radiometry, Spaceborne photography, Meteorological data, Data processing, Data transmission

The U.S. Air Force operates the Defense Meteorological Satellite Program (DMSP), a system of near-polar-orbiting satellites designed for use in operational weather forecasting and other applications. DMSP satellites carry a suite of sensors that provides images of the earth and vertical profiles of the atmosphere. These include the Operational Linescan System (OLS) visible and infrared imager, the Special Sensor Microwave Imager (SSM/I), SSM/T temperature profiler, and SSM/T-2 water vapor profiler, which are described. The National Snow and Ice Data Center (NSIDC) will provide user services for DMSP data to the cryospheric/polar research community. This paper describes the data sets available through NSIDC and applications of these data for cryospheric/polar research. The status of the archive and user services is described. Examples of data are illustrated.

51-1185

Antarctic Meteorological Research Center at the University of Wisconsin and McMurdo, Antarctica.

Stearns, C.R., Young, J.T., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.108.

Polar atmospheres, Synoptic meteorology, Meteorological data, Data processing, Data transmission, Organizations, Research projects, Antarctica—McMurdo Station

The functions of the Antarctic Meteorological Research Center (AMRC) are: to collect, process, archive, and display all possible satellite and ground based meteorological data at McMurdo Station for research applications; to collect all useful and available synoptic meteorology products from sources other than Antarctica, such as the synoptic outputs of the Australian Bureau of Meteorology and the University of Wisconsin; and to distribute the antarctic meteorological data to all interested parties over Internet in McIDAS format (at the present time).

51-1186

Evaluation of a method for estimating the surface temperature inversion strength on the south polar plateau using slope flow theory.

Cassano, J.J., Stearns, C.R., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.109-111, 5 refs.

Surface temperature, Temperature inversions, Wind (meteorology), Wind pressure, Statistical analysis, Antarctica—Amundsen-Scott Station

Persistent katabatic winds over the gentle ice slopes in the interior of Antarctica have previously been modeled using slope flow theory, given a terrain slope, fall line direction, and an estimate of the temperature inversion strength. The goal of this project was to evaluate a method which would allow an estimate of the surface inversion strength using automatic weather station (AWS) data and a slope flow theory. These katabatic winds are driven by a sloped inversion pressure gradient force. The sloped inversion pressure gradient force arises from horizontal differences in the air temperature due to the presence of a temperature inversion over sloping terrain, shown in a figure.

51-1187

Two years of IR images south of 40 deg S every three hours.

Stearns, C.R., Young, J.T., Sinkula, B., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.112.

Spaceborne photography, Infrared photography, Weather observations, Meteorological data, Image processing, Data transmission

Composite satellite images in the 11.5 to 12.5 mm band are formed at three hourly intervals ±50 minutes using the geostationary satellites GOES-7, 112°W; GMS, 140°E; Meteosat-3, 0°; Meteosat 4, 60°W and polar orbiting satellites NOAA 11 and 12. The final image is one megabyte in size and the resolution is 10 km. The images are stored on optical disks. The geostationary satellites are entered into the composite image first and the polar orbiting satellites overwrite the geostationary satellites. The image extends from the South Pole to approximately 34°S.

51-1188

Temporal variability of precipitation over the western Antarctic Peninsula.

Turner, J., Colwell, S.R., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.113-116, 5 refs.

Polar atmospheres, Atmospheric circulation, Precipitation (meteorology), Snowfall, Synoptic meteorology, Meteorological data, Statistical analysis, Antarctica—Antarctic Peninsula, Antarctica—Faraday Station

The authors examine the variation of precipitation over the western side of the Antarctic Peninsula through an investigation of the long series of surface synoptic reports made at Faraday Station. The variability of precipitation throughout the year is considered along with changes observed since the 1950s. The variability observed is related to changes noted in other surface meteorological observations from Faraday, the sea ice extent and the broader scale atmospheric circulation changes determined from the series of surface analyses prepared by the Australian Bureau of Meteorology.

51-1189

Changes in the low-level tropospheric temperature inversion over the Arctic Ocean, 1950-1990.

Kahl, J.D.W., Martinez, D.A., Zaĭtseva, N.A., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.117-121, 21 refs.

Polar atmospheres, Marine atmospheres, Atmospheric circulation, Air temperature, Surface temperature, Temperature inversions, Climatic changes, Statistical analysis

51-1190

Abrupt changes in the seasonal cycle of North American snow cover.

Leathers, D.J., Robinson, D.A., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.122-126, 12 refs.

Snow cover distribution, Snowfall, Snow accumulation, Snow heat flux, Snow air interface, Atmospheric circulation, Radiation balance, Climatic changes, Statistical analysis

51-1191

Regional signals in northern hemisphere snow cover during autumn and spring.

Frei, A., Robinson, D.A., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.127-131, 15 refs.

Snow cover distribution, Snowfall, Snow cover effect, Snow heat flux, Snow air interface, Atmospheric circulation, Climatic changes, Statistical analysis

51-1192

Spring season climate variability in the central Canadian Arctic Islands.

Agnew, T.A., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.132-137, 18 refs.

Polar atmospheres, Marine atmospheres, Atmospheric circulation, Air temperature, Precipitation (meteorology), Seasonal variations, Statistical analysis, Canada—Northwest Territories—Resolute Bay

51-1193

Intercomparison of global climate model simulations of arctic temperature.

Tao, X., Chapman, W.L., Walsh, J.E., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.138-143, 11 refs.

Polar atmospheres, Marine atmospheres, Atmospheric circulation, Air temperature, Surface temperature, Global warming, Computerized simulation, Statistical analysis

51-1194

Development of a regional climate model of the western Arctic.

Lynch, A.H., Chapman, W.L., Walsh, J.E., Weller, G., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.144-149, 17 refs.

Polar atmospheres, Marine atmospheres, Atmospheric circulation, Air ice water interaction, Global warming, Computerized simulation

51-1195

On the sea ice-albedo climate feedback mechanism.

Schramm, J.L., Curry, J.A., Ebert, E.E., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.150-155, 12 refs.

Polar atmospheres, Marine atmospheres, Atmospheric circulation, Air ice water interaction, Sea ice distribution, Ice cover effect, Ice heat flux, Albedo, Global warming, Computerized simulation

51-1196

Correlation of ice thickness variability to atmospheric circulation over the North Pole, 1958-1992.

Walsh, J.E., Weaver, R.L.S., Colony, R., McLaren, A.S., Bourke, R.H., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.156-161, 8 refs.

Polar atmospheres, Atmospheric circulation, Ice cover thickness, Ice cover effect, Air ice water interaction, Ice bottom surface, Subglacial observations, Statistical analysis

51-1197

Impact of the semi-annual cycle on South Pacific sea ice extent in two contrasting years.

Harangozo, S.A., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.162-167, 9 refs.

Polar atmospheres, Marine atmospheres, Atmospheric circulation, Air ice water interaction, Sea ice distribution, Ice conditions, Ice edge, Seasonal variations, Antarctica—Bellingshausen Sea, Antarctica—Ross Sea

In this paper a simple hypothesis is tested that interannual alterations in ice extent arise principally through atmospheric circulation variations that control the amount of ice drift/advection and *in-situ* freezing and, in turn, that the circulation alterations are ultimately tied to amplitudinal adjustments of the semi-annual cycle. This focuses on the Bellingshausen Sea between 95 and 75°W and the eastern part of the Ross Sea between 160 and 140°W where the opposing winter ice extent anomalies in the years 1983 and 1986 were prominent.

51-1198

Cloud amount and radiation: effects of climatology and method on arctic sea-ice simulations.

Maslanik, J.A., Key, J.R., Schweiger, A.S., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.168-173, 16 refs.

Polar atmospheres, Cloud cover, Radiation balance, Sea ice distribution, Ice heat flux, Ice growth, Ice models, Computerized simulation

51-1199

Modeling of the coupled katabatic/ocean and ice systems of the Antarctic.

Goodrick, S., England, D., McNider, R.T., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.174-179, 26 refs.

Polar atmospheres, Atmospheric circulation, Wind (meteorology), Ocean currents, Upwelling, Air ice water interaction, Mathematical models

It is the purpose of this paper to begin a model study of the interaction of antarctic katabatic flow with the coastal ocean. A coupled ocean atmosphere model is developed and simple experiments are carried out to elucidate the impact of the katabatic flows on transport and upwelling dynamics of the coastal ocean and examine the fidelity of the numerical model.

51-1200

Use of synthetic aperture radar data for verification of a coupled atmosphere-sea ice regional model.

Lynch, A.H., Glueck, M.F., Chapman, W.L., Bailey, D.A., Walsh, J.E., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.180-185, 23 refs.

Ice surveys, Sea ice distribution, Ice conditions, Polynyas, Drift, Ocean currents, Air ice water interaction, Ice models, Computerized simulation, Spaceborne photography, Synthetic aperture radar, Bering Sea

51-1201

On getting climate and weather data over the pack ice and MIZ.

Brown, R.A., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.186-188, 8 refs.

Polar atmospheres, Atmospheric circulation, Ocean currents, Air ice water interaction, Pack ice, Ice edge, Ice heat flux, Computerized simulation

51-1202

Sea-ice interaction and the stability of the thermohaline circulation.

Yang, J.Y., Neelin, J.D., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.189-192, 15 refs.

Air ice water interaction, Ice cover effect, Ice models, Atmospheric circulation, Ocean currents, Water temperature, Salinity, Global change, Mathematical models

51-1203

Variations of river influences in the Arctic Basin.

Allard, R., Preller, R.H., Piacsek, S.A., Cheng, A., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.193-199, 9 refs.

River flow, Runoff, Sea ice distribution, Ice conditions, Ice cover thickness, Ice cover effect, Ice water interface, Ice models, Ocean currents, Water transport, Computerized simulation

51-1204

Ice and fresh water balance of the Arctic Ocean for 1979-1985.

Martin, S., Thomas, D.R., Steele, M., Rothrock, D.A., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.201-203, 3 refs.

River flow, Runoff, Ice water interface, Ice volume, Ice (water storage), Ice cover effect, Salinity, Ocean currents, Water transport, Water balance

51-1205

Deep convection in the Arctic: the evaluation of results from an OGCM with a new convection parameterization.

Paluszkiewicz, T., Hibler, L.F., Romea, R.D., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.204-209, 20 refs.

Ocean currents, Water transport, Water temperature, Salinity, Convection, Computerized simulation

51-1206

Modelling of turbulent atmospheric convection over leads.

Alam, A., Curry, J.A., Walter, B.A., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.210-213, 10 refs.

Polar atmospheres, Marine atmospheres, Atmospheric circulation, Air ice water interaction, Ice openings, Ice heat flux, Ice air interface, Turbulent exchange, Convection, Mathematical models

51-1207

Turbulent oceanic heat flux during winter in the central Weddell Sea.

McPhee, M.G., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.214-217, 7 refs.

Polar atmospheres, Marine atmospheres, Atmospheric circulation, Ocean currents, Air ice water interaction, Ice heat flux, Polynyas, Turbulent exchange, Antarctica—Weddell Sea

During July and Aug. of 1994, the Antarctic Zone Flux Experiment (ANZFLUX) was executed from the National Science Foundation research icebreaker *Nathaniel B. Palmer,* in the Weddell Sea. The main thrust of the experiment was measuring fluxes of momentum, heat, salt and other properties in the upper ocean in at least two locations in the cyclonic gyre that dominates the circulation of the central Weddell. Understanding what maintains the present wintertime flux regime in the Weddell may be an important link in tracing how the abyssal ocean interacts with the rest of the climate system.

51-1208

Onset time and strength of oceanic deep convection diagnosed from an ocean large-eddy simulation model.

Denbo, D.W., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.218-223, 8 refs.

Atmospheric circulation, Air water interactions, Ocean currents, Water transport, Water temperature, Salinity, Turbulent exchange, Convection, Mathematical models

51-1209

Feature model for arctic upper ocean thermal structure.

Chu, P.C., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.224-227, 2 refs.

Polar atmospheres, Marine atmospheres, Atmospheric circulation, Air water interactions, Ocean currents, Water transport, Water temperature, Salinity, Turbulent exchange, Statistical analysis, Mathematical models

51-1210

Simulated antarctic mesoscale processes and climate.

Hines, K.M., Bromwich, D.H., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.228-233, 15 refs.

Polar atmospheres, Atmospheric circulation, Atmospheric pressure, Air temperature, Temperature inversions, Surface temperature, Wind (meteorology), Computerized simulation, Antarctica

In this paper, the authors examine the meteorology of high southern latitudes simulated by a high-resolution mesoscale model, a version of the Penn State/National Center for Atmospheric Research Mesoscale Model, version 4 (PSU/NCAR MM4). The mesoscale model can be run independently with initial and boundary conditions obtained from analyses by the European Centre for Medium-Range Weather Forecasts (ECMWF) or be nested within the NCAR Community Climate Model version 2 (CCM2). The focus of this paper is a preliminary assessment of a nested simulation of climate during the austral winter.

51-1211

Synoptic considerations of storms in the southern Beaufort Sea—expectations for BASE.

Hudak, D.R., Stewart, R.E., Moore, G.W.K., Hudson, E.T., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.234-237, 3 refs.

Polar atmospheres, Marine meteorology, Air water interactions, Atmospheric circulation, Atmospheric disturbances, Storms, Synoptic meteorology, Meteorological data, Statistical analysis, Weather forecasting, Beaufort Sea

51-1212

Investigation of an intense mesoscale cyclone over southern Marie Byrd Land, West Antarctica.

Bromwich, D.H., Carrasco, J.F., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.238-243, 17 refs.

Polar atmospheres, Atmospheric circulation, Atmospheric pressure, Atmospheric disturbances, Storms, Cloud cover, Wind (meteorology), Antarctica—Marie Byrd Land

Observational studies of mesoscale cyclones over the high southern latitudes have demonstrated the large activity of these perturbations over the antarctic coastal areas as well as the surrounding sea-ice zone. A recent study of mesoscale cyclones, based on the examination of one year of satellite imagery, showed that a significant number of mesoscale vortices observed over the Ross Ice Shelf came from Marie Byrd Land, West Antarctica, suggesting that this region is another cyclo-genetic area. On Nov. 11-12, 1992, the Polar Meteorology Group from the Byrd Polar Research Center encountered a strong mesoscale cyclone over southern Marie Byrd Land. Here, the authors present an analysis of this event.

51-1213

Characterization of polar cyclonic activity and relationship to observed snowfall events at McMurdo Station, Antarctica.

Rockey, C.C., Braaten, D.A., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.244-245, 3 refs.

Polar atmospheres, Atmospheric circulation, Atmospheric disturbances, Snowfall, Snowstorms, Antarctica—McMurdo Station

Throughout the year, coastal margins of Antarctica are frequently influenced by episodic snowfall events which produce trace amounts of snow, but only occasionally by snowfall events which produce measurable amounts. Previous investigations have not considered precipitation in characterization of antarctic cyclones, and the primary objective in this study is to link point precipitation measurements to cyclone characteristics and source region. Infrared satellite images, from Jan. 25 through July 31, 1994, have been used to identify, classify and track meso- and synoptic scale lows around Antarctica, and snowfall observations from McMurdo Station for this same period have been obtained and are discussed.

51-1214

Split jet evolution over the South Pacific Ocean during the 1986-1989 ENSO cycle.

Smith, S.R., Bromwich, D.H., Chen, B., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.246-251, 24 refs.

Polar atmospheres, Marine atmospheres, Ocean currents, Air water interactions, Atmospheric circulation, Atmospheric pressure, Atmospheric disturbances, South Pacific Ocean

The El Niño/Southern Oscillation (ENSO) has long been recognized as the major climate variation of the tropical South Pacific Ocean. The primary obstacle to linking Antarctica to ENSO is finding a dynamic north/south connection. Using hemispheric analyses, the authors established that dramatic changes in the split jet stream occur in the South Pacific sector (180° to 120°W). They present hypotheses consistent with the data results and the current knowledge of Southern Hemisphere dynamics to investigate the meridional circulation from the tropics to the South Pole during the 1986-89 ENSO cycle.

51-1215

Low-level atmospheric jets over the western Weddell Sea.

Andreas, E.L., Claffey, K.J., Makshtas, A.P., MP 3920, Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.252-257, 15 refs.

Polar atmospheres, Marine meteorology, Atmospheric boundary layer, Atmospheric circulation, Wind (meteorology), Wind velocity, Drift stations, Weather stations, Antarctica—Weddell Sea

A common theme in the literature is that the polar regions are ideal "laboratories" for studying atmospheric processes. The authors reiterate that theme and demonstrate it with a study of the stable atmospheric boundary layer (ABL) on Ice Station Weddell (ISW). Understanding of the stable boundary layer lags behind that of the convective boundary layer because, in more temperate latitudes, stable boundary layers are strictly nighttime phenomena and, thus, are rarely in steady state. On ISW, however, over 96% of the radiosoundings showed that the lower atmosphere was stably stratified. The authors, thus, had the opportunity to observe repeatedly, and in detail, the structure of the stable boundary layer. They found that the main feature of the stable boundary layer over the western Weddell Sea was a low-level jet. Almost 80% of the soundings revealed this jet, which frequently engulfed and battered their tethered radiosounding balloon. The authors document the characteristics of the jet and offer a mathematical explanation for its dynamics.

51-1216

Double jets in a two-level PE model.

Chen, B., Panetta, R.L., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.258-261, 15 refs.

Atmospheric circulation, Fronts (meteorology), Wind (meteorology), Wind velocity, Computerized simulation

The observational analyses have revealed that there are two jets in the Southern Hemisphere winter, a subtropical jet and a polar front jet. The meridional cross-section with height indicates that the subtropical jet has baroclinic structure whereas the polar jet shows roughly equivalent barotropic structure. Using a two-level, primitive equation, spectral model, the purpose in the present work is to find forcing which produces a polar front jet well-separated from the subtropical jet, to analyze the mechanism of formation and maintenance of two kinds of jets, and to study the interactions between the subtropical jet and polar front jet.

51-1217

Modeling katabatic winds over West Antarctica.

Du, Y., Bromwich, D.H., Parish, T.R., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.262-267, 9 refs.

Polar atmospheres, Atmospheric circulation, Wind (meteorology), Wind direction, Wind velocity, Computerized simulation, Antarctica—Siple Coast

Katabatic winds, which are driven by strong radiative cooling of the sloping ice surface, are a common climatic feature of the lower atmosphere over the continent of Antarctica, especially along the periphery. This strong wind has great impact on the behavior of the atmospheric boundary layer and the overlying troposphere. A better understanding of the antarctic katabatic winds is important to the study of atmospheric processes in high southern latitudes. This paper summarizes results from investigations of the surface wind regime over West Antarctica with a three dimensional mesoscale numerical model and makes comparisons with available observational data.

51-1218

Influence of geostrophic forcing on the katabatic wind regime at the Greenland ice sheet margin.

Elkhalfi, A., Rosset, R., Mascart, P., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.268-271, 9 refs.

Polar atmospheres, Ice sheets, Ice air interface, Atmospheric circulation, Atmospheric boundary layer, Wind (meteorology), Wind velocity, Wind direction, Greenland

51-1219

Observational study of the springtime Siple Coast confluence zone.

Bromwich, D.H., Liu, Z., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.272-277, 12 refs.

Polar atmospheres, Atmospheric circulation, Atmospheric boundary layer, Wind (meteorology), Wind velocity, Wind direction, Air temperature, Weather observations, Antarctica—Siple Coast

The summer streamline simulation by Parish and Bromwich (1986) shows that there should be a confluence zone (where drainage flows converge) in the Siple Coast area. Analysis from the 1984-85 and 1985-86 austral summer observations taken at three temporary camps confirms the existence of the Siple Coast confluence zone. To improve the understanding of the katabatic wind regime, the 1992 field program was undertaken. Based upon the model results and previous surface observations, two sites (Upstream B and South Camp) for the campaign were chosen in the confluence zone near Siple Coast. An extensive observational network was established in order to study the confluence zone structure in both lateral and vertical directions. Results are discussed and illustrated.

51-1220

Heights of temperature inversions in the arctic troposphere.

Warren, S.G., Mahesh, A., Walden, V.P., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.278-279, 2 refs.

Polar atmospheres, Air temperature, Temperature inversions, Climatic changes, Meteorological data, Statistical analysis

51-1221

Interaction between polar climate and global warming.

Manabe, S., Stouffer, R.J., Spelman, M.J., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.J9/1-J9/9, 25 refs. Joint paper with 6th Symposium on Global Change Studies.

Polar atmospheres, Marine atmospheres, Atmospheric circulation, Atmospheric composition, Global warming, Computerized simulation

This paper describes the response of a coupled ocean-atmosphere-land surface model, developed at the Geophysical Fluid Dynamics Laboratory, to increasing atmospheric CO_2. It includes a summary of the results in three published papers (Stouffer et al., 1989; Manabe et al., 1991, 1992). In addition, results from recent investigations (Manabe and Stouffer, 1993, 1994) are discussed, exploring the multiple-century response of the coupled model to a doubling and quadrupling of atmospheric CO_2.

51-1222

Global simulations with 1° sea-ice and ocean model components: present and future prospects.

Washington, W.M., Meehl, G.A., Bettge, T.W., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.J9/10-J9/13, 10 refs. Joint paper with 6th Symposium on Global Change Studies.

Polar atmospheres, Marine atmospheres, Atmospheric circulation, Air ice water interaction, Sea ice distribution, Ice conditions, Ice cover thickness, Ice models, Global warming, Computerized simulation, Antarctica—Weddell Sea

At the National Center for Atmospheric Research, the authors have been conducting global climate coupled-model (atmosphere-ocean-sea ice) experiments with and without flux adjustment at the ocean surface. This climate system uses a relatively high resolution (1°, 20-level) version of the Semtner-Chervin (1988, 1992) ocean model compared to that used in most other greenhouse experiments. Details of sea ice and its interactions with the other aspects of the coupled model, are presented. The antarctic sea-ice distribution shows a large seasonal area change. Also, there are areas of greater ice thickness and concentration in the Weddell Sea and close to Antarctica.

51-1223

Intercomparison of simulated polar climates by global climate models.

Bromwich, D.H., Chen, B., Pan, X.G., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.J9/14-J9/19, 20 refs. Joint paper with 6th Symposium on Global Change Studies.

Polar atmospheres, Marine atmospheres, Atmospheric circulation, Atmospheric pressure, Precipitation (meteorology), Evaporation, Global change, Computerized simulation

Intercomparisons are performed of simulated arctic and antarctic climate for 1979-1988 by 17 currently available international climate models. The accuracy of modeled sea-level pressure depends on horizontal resolution. It seems that a critical resolution exists at about 4°x4°, i.e., simulated results are significantly improved when the model resolution is better than the critical resolution. There is a maximum discrepancy in simulated precipitation over the Arctic and Antarctica. It is suggested that the cause of the excess simulated precipitation in high latitudes must be factors other than moisture availability, most likely the simulated general circulations of the respective models. Most of the models are able to capture the evaporation/sublimation rate quite well over the polar regions. Thus the large errors in the net precipitation over high latitudes are thought to be caused by the anomalously large simulated precipitation rates.

51-1224

Recent variations of arctic climate: the observational evidence.

Walsh, J.E., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.J9/20-J9/25, 24 refs. Joint paper with 6th Symposium on Global Change Studies.

Polar atmospheres, Marine atmospheres, Atmospheric circulation, Air temperature, Precipitation (meteorology), Air ice water interaction, Sea ice distribution, Snow cover distribution, Global warming

51-1225
Interdecadal variability in the Arctic and northern North Atlantic: observations and models.
Mysak, L.A., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.J9/26-J9/27, 7 refs. Joint paper with 6th Symposium on Global Change Studies.
Polar atmospheres, Marine atmospheres, Atmospheric circulation, Air ice water interaction, Climatic changes, Computerized simulation

51-1226
Chemical evolution of the polar stratosphere: a status report.
Brune, W.H., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.J9/28-J9/29, 6 refs. Joint paper with 6th Symposium on Global Change Studies.
Polar atmospheres, Polar stratospheric clouds, Atmospheric composition, Ozone
The chemical processes involved in the rapid ozone loss in polar regions are described. The following issues are examined: the cause of year-to-year variability in ozone loss observed at the poles, the details of the microphysics and chemistry of sulphate aerosols and polar stratospheric clouds, the relative importance of export of polar vortex air, and the interactions among the chemical families and the possibility that additional chemistry is occurring unobserved.

51-1227
Another look at the seasonal variation of polar cloudiness with satellite and surface observations.
Rossow, W.B., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.J10/1-J10/4, 16 refs. Joint paper with Conference on Cloud Physics.
Polar atmospheres, Marine atmospheres, Cloud cover, Seasonal variations, Radiation balance
The polar regions exhibit completely different energy balances, where solar heating is less important than atmospheric heat transport and clouds reverse their lower latitude roles to heat the surface and cool the atmosphere. However, the annual mean energy balance and the roles played by the atmosphere, ocean, and clouds are composed of complicated seasonal variations. Extreme conditions have inhibited collection of adequate observations to diagnose these variations. This paper is a progress report on continuing refinements of the analyses of available measurements of clouds.

51-1228
Anthropogenic sulfuric acid: a possible explanation for the observed high arctic cooling.
Girard, É., Blanchet, J.P., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.J10/5-J10/8, 18 refs. Joint paper with Conference on Cloud Physics.
Polar atmospheres, Atmospheric composition, Air pollution, Aerosols, Cloud physics, Condensation nuclei, Ice crystal nuclei, Nucleation rate, Humidity, Climatic changes, Computerized simulation

51-1229
Influence of clouds upon formation of winter radiation balance over ice covered surface of the Arctic Ocean.
Appel', I.L., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.J10/9-J10/10, Joint paper with Conference on Cloud Physics.
Polar atmospheres, Cloud cover, Radiation balance, Air temperature, Surface temperature, Ice heat flux

51-1230
Seasonal cycle of cloud cover at the poles, from surface observations screened by a moonlight criterion.
Warren, S.G., Hahn, C.J., London, J., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.J10/11, 4 refs. Joint paper with Conference on Cloud Physics.
Polar atmospheres, Cloud cover, Seasonal variations, Visibility, Weather observations, Antarctica—Amundsen-Scott Station
At Amundsen-Scott Station, the average reported cloud cover is about 58% in summer and 37% in winter. Nighttime (winter) cloud observations on the Antarctic Plateau present special difficulties: the typically thin clouds may cause no more dimming of the stars than does heavy diamond-dust; moonlit clouds may be confused with aurora, which is usually colorless and occurs on most days; and obscuration of the sky due to blowing snow can occur nearly one-third of the time in winter and is probably correlated with cloud cover.

51-1231
Cloud properties over winter North Atlantic and Arctic Oceans as inferred from satellite data.
Liu, G.S., Curry, J.A., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.J10/12-J10/15, 5 refs. Joint paper with Conference on Cloud Physics.
Polar atmospheres, Marine atmospheres, Cloud cover, Clouds (meteorology), Unfrozen water content, Water vapor, Vapor transfer, Humidity, Precipitation (meteorology), Spaceborne photography

51-1232
Freezing temperatures of $H_2SO_4/HNO_3/H_2O$ mixtures: implications for PSC initiation.
Song, N.H., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.J11/1-J11/2, 2 refs. Joint paper with Conference on Cloud Physics.
Polar atmospheres, Atmospheric composition, Polar stratospheric clouds, Freezing points
Some $H_2SO_4/HNO_3/H_2O$ mixtures freeze readily under conditions applicable to the stratosphere. Variables that control the freezing are not fully identified, but how they affect PSC initiation is well known. The objective of the current study is to measure freezing temperatures of the ternary mixture over a broad composition range and to apply the data to the understanding of PSC initiation.

51-1233
Production of cloud condensation nuclei (CCN) by dissipating clouds at Palmer Station, Antarctica: a natural anti-greenhouse mechanism.
Saxena, V.K., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.J11/3-J11/6, 31 refs. Joint paper with Conference on Cloud Physics.
Polar atmospheres, Marine atmospheres, Atmospheric composition, Cloud cover, Cloud physics, Aerosols, Condensation nuclei, Climatic factors, Global warming, Antarctica—Palmer Station
The processes that could enhance CCN concentration in marine environment are of prime importance from the standpoint of climate change. The purpose of this paper is to report the ground based observations of CCN enhancement at Palmer Station recorded during Jan.-Feb. 1994, using the Fukuta-Saxena CCN Spectrometer. Further analysis of CCN bursts reported here is underway and the field observations are scheduled to be repeated in austral spring/summer 1995.

51-1234
Life cycles of summertime arctic stratus clouds.
McInnes, K.L., Curry, J.A., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.J12/1-J12/3, 9 refs. Joint paper with Conference on Cloud Physics.
Polar atmospheres, Marine atmospheres, Cloud cover, Cloud physics, Radiation balance, Air ice water interaction

51-1235
Effects of surface moisture flux on the stratocumulus cloud layer microphysical properties.
Liu, Q.F., Kogan, E.L., Lilly, D.K., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.J12/4-J12/7, 5 refs. Joint paper with Conference on Cloud Physics.
Atmospheric boundary layer, Cloud cover, Cloud physics, Condensation nuclei, Water vapor, Vapor transfer, Unfrozen water content, Computerized simulation

51-1236
Preliminary results from BASE field experiment: study of mixed-phase boundary layer clouds.
Pinto, J.O., Curry, J.A., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.J12/8-J12/10, 3 refs. Joint paper with Conference on Cloud Physics.
Polar atmospheres, Marine atmospheres, Atmospheric boundary layer, Cloud cover, Cloud physics, Cloud droplets, Particle size distribution, Unfrozen water content, Beaufort Sea

51-1237
Large eddy simulation of turbulent flow in a wintertime marine convective boundary layer.
Rao, G.S., Agee, E.M., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.J12/11-J12/15, 12 refs. Joint paper with Conference on Cloud Physics.
Lake effects, Snowstorms, Cloud cover, Cloud physics, Turbulent boundary layer, Turbulent exchange, Computerized simulation, United States—Michigan, Lake

51-1238
Origin of mirabilite in McMurdo Sound area. [O genezise mirabilita v raĭone zaliva Mak-Mërdo (Antarktida)]
Barkov, N.I., Nikolaev, V.I., Strizhov, V.P., *Litologiia i poleznye iskopaemye,* July-Aug. 1995, No.4, p.415-420, In Russian. 26 refs.
Glacial geology, Ice composition, Marine geology, Moraines, Geochronology, Antarctica—McMurdo Sound
In the light of new results of investigations on oxygen-isotope composition of natural ice and mirabilite in moraine sediments of McMurdo Sound area, the genesis of these salts is discussed. It is concluded that the salt sources are primarily marine as well as endogenic, which precludes their use in paleogeographic reconstructions.

51-1239
Seasonal variation of DDT and its metabolites in the St. Lawrence River (Canada) and four of its tributaries.
Pham, T., Lum, K., Lemieux, C., *Science of the total environment,* Jan. 26, 1996, Vol.179, p.17-26, 30 refs.
River basins, Runoff, Estuaries, Hydrocarbons, Water pollution, Snowmelt, Meltwater, Hydrogeochemistry, Environmental tests, Sampling, Seasonal variations, Surface drainage, Canada—Saint Lawrence River

51-1240
Mars ozone measurements near the 1995 aphelion: Hubble space telescope ultraviolet spectroscopy with the faint object spectrograph.
Clancy, R.T., et al, *Journal of geophysical research,* May 25, 1996, 101(E5), p.12,777-12,783, 19 refs.
Mars (planet), Atmospheric composition, Ozone, Carbon dioxide, Remote sensing, Ultraviolet radiation, Ice spectroscopy, Ice sheets, Extraterrestrial ice, Ice detection, Albedo, Ice cover effect

51-1241
On the ocean's upper boundary conditions in regions influenced by sea ice.
Stössel, A., *Physica D,* Nov. 15, 1996, 98(2-4), Annual International Conference of the Center for Nonlinear Studies, 15th, Los Alamos, NM, May 15-19, 1996. Nonlinear phenomena in ocean dynamics. Paper, p.614-624, 53 refs.
Oceanography, Climatology, Atmospheric boundary layer, Ocean currents, Sea ice distribution, Air ice water interaction, Ice cover effect, Ice cover thickness, Ice heat flux, Ice models, Wind factors, Mathematical models, Thermodynamics
This study provides an overview of the highly nonlinear and interactive processes involved with sea ice modifying the upper boundary conditions for ocean models in both the Arctic and Antarctic. The physical representation of sea ice in present-day global climate models in comparison to regional state-of-the-art sea-ice models, the role of different external forcing fields, and various sea-ice forcing mechanisms considering the role of interactive boundary-layer processes are discussed. This discussion includes the nonlinear impact of subgrid-scale heterogeneities on the momentum forcing. Finally, the possible impact of sea ice on global ocean characteristics is discussed. (Auth. mod.)

51-1242

Full-glacial—late-glacial palaeoclimate of the Southern Andes: evidence from pollen, beetle and glacial records.

Heusser, C.J., Lowell, T.V., Heusser, L.E., Hauser, A., Andersen, B.G., Denton, G.H., *Journal of quaternary science,* May-June 1996, 11(3), p.173-184, Refs. p.183-184.

Paleoclimatology, Paleoclimatology, Climatic changes, Temperature variations, Glacial deposits, Palynology, Sampling, Quaternary deposits, Geochronology, Stratigraphy, Radioactive age determination, Chile—Andes

51-1243

Sedimentology and stratigraphy in the cave Hamnsundhelleren, western Norway.

Valen, V., Mangerud, J., Larsen, E., Hufthammer, A.K., *Journal of quaternary science,* May-June 1996, 11(3), p.185-201, 42 refs.

Marine geology, Subarctic landscapes, Pleistocene, Caves, Glacial deposits, Sedimentation, Stratigraphy, Quaternary deposits, Radioactive age determination, Ice dams, Magnetic properties, Correlation, Norway

51-1244

Significance of snowblow in the generation of Loch Lomond Stadial (Younger Dryas) glaciers in the western Pennines, northern England.

Mitchell, W.A., *Journal of quaternary science,* May-June 1996, 11(3), p.233-248, 63 refs.

Pleistocene, Cirque glaciers, Snow line, Glacier oscillation, Geological maps, Geomorphology, Landforms, Wind direction, Blowing snow, Snow cover effect, Landslides, Mass transfer, Quaternary deposits, United Kingdom—England

51-1245

Geomorphology and hydrogeological significance of the Holocene pingos in the Karup Valley area, Trail Island, northern east Greenland.

Worsley, P., Gurney, S.D., *Journal of quaternary science,* May-June 1996, 11(3), p.249-262, 22 refs.

Permafrost hydrology, Permafrost distribution, Geomorphology, Arctic landscapes, Thermokarst development, Pingos, Classifications, Taliks, Ground water, Hydrogeology, Ice formation, Greenland—Traill Island

51-1246

Weathering and dispersal of polychlorinated biphenyls from a known source in the Canadian Arctic.

Grundy, S.L., Bright, D.A., Dushenko, W.T., Reimer, K.J., *Environmental science & technology,* Sep. 1996, 30(9), p.2661-2666, 26 refs.

Arctic landscapes, Soil pollution, Plant ecology, Weathering, Mosses, Patterned ground, Substrates, Hydrocarbons, Environmental tests, Sampling, Statistical analysis, Vegetation patterns, Canada—Northwest Territories—Cambridge Bay

51-1247

Model for the phase transition from ice VII to ice VIII: rigorous results.

Pitiş, R., Huckaby, D.A., *Physica A,* Nov. 1, 1996, 232(3-4), Max Born Symposium on the Nature of Crystalline States, 6th, Kudowa-Zdrój, Poland, Sep. 21-24, 1995. Proceedings, p.702-712, 22 refs.

Ice physics, Ice mechanics, Ice models, Molecular structure, Phase transformations, Latticed structures, Defects, Molecular energy levels, Hydrogen bonds, Temperature effects, Statistical analysis

51-1248

Interannual variability in reconstructed Canadian snow cover, 1915-1992.

Brown, R.D., Goodison, B.E., *Journal of climate,* June 1996, 9(6), p.1299-1318, 62 refs.

Climatology, Snow surveys, Snow cover distribution, Seasonal variations, Snow depth, Mass balance, Atmospheric circulation, Synoptic meteorology, Statistical analysis, Correlation, Canada

51-1249

Sensitivity of simulated global climate to perturbations in low-cloud microphysical properties. Part I: globally uniform perturbations.

Chen, C.T., Ramaswamy, V., *Journal of climate,* June 1996, 9(6), p.1385-1402, 47 refs.

Climatology, Global change, Cloud cover, Cloud physics, Water content, Ice cover thickness, Sea ice distribution, Radiation balance, Albedo, Hydrologic cycle, Simulation, Greenhouse effect, Mathematical models

The sensitivity of the global climate to perturbations in the microphysical properties of low clouds is investigated using a general circulation model coupled to a static mixed layer ocean with fixed cloud distributions and incorporating a new broadband parameterization for cloud radiative properties. A series of GCM experiments leads to the following results: the model's climate sensitivity is virtually independent of the sign, magnitude, and the spatial pattern of the forcings considered. Changes in moisture, tropospheric status stability, and sea ice extent govern the vertical and zonal patterns of the temperature response. The zonal surface temperature response pattern, normalized with respect to the global mean, is different for experiments with positive and negative forcings, particularly in the polar regions of both hemispheres, due to differing changes in sea ice. (Auth. mod.)

51-1250

Composite temperature record from the Greenland summit, 1987-1994: synthesis of multiple automatic weather station records and SSM/I brightness temperatures.

Shuman, C.A., Fahnestock, M.A., Bindschadler, R.A., Alley, R.B., Stearns, C.R., *Journal of climate,* June 1996, 9(6), p.1421-1428, 20 refs.

Climatology, Polar atmospheres, Air temperature, Surface temperature, Seasonal variations, Radiometry, Brightness, Spacecraft, Weather stations, Correlation, Greenland—Summit

51-1251

Responses of some North American CAM plants to freezing temperatures and doubled CO_2 concentrations: implications of global climate change for extending cultivation.

Nobel, P.S., *Journal of arid environments,* Oct. 1996, 34(2), p.187-196, Refs. p.195-196.

Agriculture, Plant physiology, Plant tissues, Frost resistance, Global change, Climatic changes, Air temperature, Freezing, Acclimatization, Carbon dioxide, Temperature effects, Simulation

51-1252

Classification of Baltic Sea ice types by airborne multifrequency microwave radiometer.

Kurvonen, L., Hallikainen, M., *IEEE transactions on geoscience and remote sensing,* Nov. 1996, 34(6), p.1292-1299, 22 refs.

Remote sensing, Oceanography, Sensor mapping, Ice detection, Aerial surveys, Radiometry, Brightness, Pack ice, Young ice, Classifications, Snow cover effect, Accuracy, Baltic Sea

51-1253

Bidirectional effects of AVHRR measurements over boreal regions.

Li, Z.Q., Cihlar, J., Zheng, X.N., Moreau, L., Ly, H., *IEEE transactions on geoscience and remote sensing,* Nov. 1996, 34(6), p.1308-1322, 44 refs.

Remote sensing, Forest ecosystems, Forest land, Spaceborne photography, Landscape types, Radiometry, Scattering, Reflectivity, Classifications, Accuracy

51-1254

Millimeter-wave specular and diffuse multiphase terrain.

Narayanan, R.M., Cox, D.D., Ralston, J.M., Christian, M.R., *IEEE transactions on antennas and propagation,* May 1996, 44(5), p.627-645, 11 refs.

Radio waves, Radar echoes, Terrain identification, Wave propagation, Specular reflection, Snow cover effect, Snow melting, Snow optics, Antennas, Simulation, Reflectivity, Analysis (mathematics)

51-1255

Sedimentology, dating and palaeoclimatic interpretation of a 76.3 ka record from Lago Grande di Monticchio, southern Italy.

Zolitschka, B., Negendank, J.F.W., *Quaternary science reviews,* Mar.-Apr. 1996, 15(2-3), p.101-112, 38 refs.

Paleoclimatology, Quaternary deposits, Limnology, Lacustrine deposits, Sedimentation, Layers, Stratigraphy, Sampling, Geochronology, Radioactive age determination, Italy—Lago Grande de Monticchio

51-1256

Vegetation history and climate of the last 15,000 years at Laghi di Monticchio, southern Italy.

Watts, W.A., Allen, J.R.M., Huntley, B., Fritz, S.C., *Quaternary science reviews,* Mar.-Apr. 1996, 15(2-3), p.113-132, Refs. p.129-131.

Pleistocene, Paleoclimatology, Climatic changes, Paleoecology, Vegetation patterns, Alpine landscapes, Lacustrine deposits, Quaternary deposits, Radioactive age determination, Stratigraphy, Palynology, Correlation, Italy—Laghi di Monticchio

51-1257

Vegetation history and palaeoclimate of the last glacial period at Lago Grande de Monticchio, southern Italy.

Watts, W.S., Allen, J.R.M., Huntley, B., *Quaternary science reviews,* Mar.-Apr. 1996, 15(2-3), p.133-153, Refs. p.151-153.

Paleoecology, Quaternary deposits, Paleoclimatology, Climatic changes, Geochronology, Vegetation patterns, Lacustrine deposits, Palynology, Ice cores, Radioactive age determination, Correlation, Italy—Lago Grande de Monticchio

51-1258

Tephrochronology of a Late Quaternary lacustrine record from the Monticchio Maar (Vulture Volcano, southern Italy).

Narcisi, B., *Quaternary science reviews,* Mar.-Apr. 1996, 15(2-3), p.155-165, 41 refs.

Pleistocene, Quaternary deposits, Lacustrine deposits, Geochronology, Magma, Sedimentation, Drill core analysis, Geochemistry, Volcanoes, Explosion effects, Italy—Monticchio Maar

51-1259

Proxy-climate and geomagnetic palaeointensity records extending back to ca. 75,000 BP derived from sediments cored from Lago Grande de Monticchio, southern Italy.

Creer, K.M., Morris, A., *Quaternary science reviews,* Mar.-Apr. 1996, 15(2-3), p.167-188, 42 refs.

Paleoclimatology, Pleistocene, Lacustrine deposits, Quaternary deposits, Drill core analysis, Magnetic properties, Geomagnetism, Remanent magnetism, Palynology, Statistical analysis, Radioactive age determination, Italy—Lago Grande de Monticchio

51-1260

High sensitivity of the palynological record in the Vico maar lacustrine sequence (Latium, Italy) highlights the climatic gradient through Europe for the last 90 ka.

Leroy, S.A.G., Giralt, S., Francus, P., Seret, G., *Quaternary science reviews,* Mar.-Apr. 1996, 15(2-3), p.189-201, 50 refs.

Paleoclimatology, Lacustrine deposits, Quaternary deposits, Climatic changes, Palynology, Paleoecology, Classifications, Lithology, Stratigraphy, Drill core analysis, Correlation, Geochronology, Italy—Vico, Lake

51-1261

Lacustrine organic fluxes and palaeoclimatic variations during the last 15 ka: Lac du Bouchet (Massif Central, France).

Sifeddine, A., Bertrand, P., Lallier-Vergès, E., Patience, A.J., *Quaternary science reviews,* Mar.-Apr. 1996, 15(2-3), p.203-211, 20 refs.

Paleoclimatology, Lacustrine deposits, Quaternary deposits, Climatic changes, Palynology, Paleoecology, Stratigraphy, Drill core analysis, Geochemistry, Sedimentation, Diagenesis, France—Lac du Bouchet

51-1262

Palaeoclimatic significance of the 300 ka mineral magnetic record from the sediments of Lac du Bouchet, France.

Williams, T., Thouveny, N., Creer, K.M., *Quaternary science reviews,* Mar.-Apr. 1996, 15(2-3), p.223-235, 42 refs.

Paleoclimatology, Climatic changes, Lacustrine deposits, Quaternary deposits, Minerals, Sedimentation, Magnetic properties, Remanent magnetism, Drill core analysis, Lithology, Geochronology, France—Lac du Bouchet

51-1263

Quantification of paleotemperature changes during isotopic Stage 2 in the La Draga continental sequence (NE Spain) based on the Mg/Ca ratio of freshwater ostracods.

Wansard, G., *Quaternary science reviews,* Mar.-Apr. 1996, 15(2-3), p.237-245, 53 refs.

Paleoclimatology, Climatic changes, Paleoecology, Quaternary deposits, Lacustrine deposits, Air temperature, Ice sheets, Ice cores, Sampling, Correlation, Geochronology, Greenland, Spain—Banyoles, Lake

51-1264

Dynamics of subnivean temperature and wind speed in subalpine forests of the Rocky Mountains.

Taylor, S.L., Buskirk, S.W., *Journal of thermal biology,* Apr. 1996, 21(2), p.91-99, 28 refs.

Microclimatology, Forest land, Air temperature, Diurnal variations, Wind velocity, Air flow, Snow cover effect, Snow depth, Ecosystems, Tunnels, Topographic effects, Simulation, United States—Wyoming—Medicine Bow Mountains

51-1265

Tailing pond remediation in the Canadian Arctic.

Kochany, J., Lugowski, A., Menkal, V, Erickson, P.L.M., *Environmental technology,* Oct. 1996, 17(10), p.1113-1121, 14 refs.

Mining, Subpolar regions, Ponds, Ice sampling, Chemical analysis, Tailings, Water pollution, Water treatment, Environmental impact, Environmental protection, Canada—Northwest Territories—Rankin Inlet

51-1266

Role of lakes in moraine formation, Chilean Lake District.

Bentley, M., *Earth surface processes and landforms,* June 1996, 21(6), p.493-507, 26 refs.

Glacial geology, Glacier oscillation, Paleoclimatology, Limnology, Moraines, Shear strength, Glacial deposits, Lacustrine deposits, Geomorphology, Sedimentation, Models, Chile

51-1267

Soil creep dynamics, soil moisture and temperature conditions on a forested slope in the granitic Vosges Mountains, France.

Auzet, A.V., Ambroise, B., *Earth surface processes and landforms,* June 1996, 21(6), p.531-542, 27 refs.

Soil mechanics, Geomorphology, Soil creep, Periglacial processes, Mountain soils, Soil profiles, Deformation, Snowmelt, Freeze thaw cycles, Saturation, Strain tests, France—Vosges Mountains

51-1268

Modeling cirrus clouds. Part I: treatment of bimodal size spectra and case study analysis.

Mitchell, D.L., Chai, S.K., Liu, Y.A., Heymsfield, A.J., Dong, Y.Y., *Journal of the atmospheric sciences,* Oct. 15, 1996, 53(20), p.2952-2966, 25 refs.

Cloud cover, Cloud physics, Ice crystal size, Ice crystal optics, Radiation balance, Aggregates, Spectra, Classifications, Sampling, Particle size distribution, Mathematical models

51-1269

Modeling cirrus clouds. Part II: treatment of radiative properties.

Mitchell, D.L., Macke, A., Liu, Y.A., *Journal of the atmospheric sciences,* Oct. 15, 1996, 53(20), p.2967-2988, 43 refs.

Cloud cover, Cloud physics, Radiation balance, Ice crystal optics, Ice crystal structure, Particle size distribution, Spectra, Radiation absorption, Optical properties, Light scattering, Attenuation, Mathematical models

51-1270

Regional variation of snowpack chemistry in the vicinity of Nikel and Zapoljarnij, Russia, northern Finland and Norway.

Reimann, C., Niakavaara, H., de Caritat, P., Finne, T.E., Äyräs, M., Chekushin, V., *Science of the total environment,* Apr. 5, 1996, 182(1-3), p.147-158, 10 refs.

Air pollution, Snow surveys, Snow impurities, Meltwater, Sampling, Mining, Aerosols, Metals, Dust, Environmental tests, Sampling, Mapping, Russia—Kola Peninsula, Norway, Finland

51-1271

Viscoelastic relaxation of a Burgers half-space: implications for the interpretation of the Fennoscandian uplift.

Rümpker, G., Wolf, D., *Geophysical journal international,* Feb. 1996, 124(2), p.541-555, 46 refs.

Tectonics, Pleistocene, Glacial geology, Glacier melting, Isostasy, Classifications, Viscoelasticity, Mathematical models, Rheology, Geologic processes

51-1272

Charge transport in frozen tetraakylammonium fluoride hydrates containing a 1:1 mixture of $K_3Fe(CN)_6$ and $K_4Fe(CN)_6$.

Opallo, M., *Journal of electroanalytical chemistry,* Aug. 1, 1996, 411(1-2), p.145-152, 54 refs.

Frozen liquids, Hydrocarbons, Solutions, Hydrates, Electrical properties, Charge transfer, Ion diffusion, Phase transformations, Electrical measurement

51-1273

New apparatus for the in-situ observation of a freeze drying process.

Saiter, J.M., Bayard, J., Delahaye, N., Varnier, S., Vautier, C., *Journal of thermal analysis,* Nov. 1995, 45(5), Polish Conference on Calorimetry and Thermal Analysis, 6th, Zakopane, Poland, Sep. 18-22, 1994, p.1223-1229, 5 refs.

Cryogenics, Freeze drying, Frozen liquids, Solutions, Laboratory techniques, Equipment, Microanalysis, Ice sublimation, Imaging

51-1274

GPS measurements to constrain geodynamic processes in Fennoscandia.

BIFROST Project, *Eos,* Aug. 27, 1996, 77(35), p.337,341, 10 refs.

Tectonics, Pleistocene, Subpolar regions, Geodetic surveys, Radomes, Bedrock, Geophysical surveys, Geologic processes, Viscosity, Isostasy, Computer applications, Finland, Sweden

51-1275

U.S., Canadian researchers explore Arctic Ocean.

Aagaard, K., Tucker, W.B., MP 3965, *Eos,* May 28, 1996, 77(22), p.209,213.

Oceanographic surveys, Global change, Climatology, Ocean currents, Atmospheric composition, Radiation balance, Marine biology, Geochemical cycles, Sea ice distribution, Water pollution, Environmental tests, Arctic Ocean

51-1276

Twin ice cores from Greenland reveal history of climate change, more.

Alley, R., *Eos,* May 28, 1996, 77(22), p.209-210.

Paleoclimatology, Climatic changes, Global change, Carbon dioxide, Ice sheets, Ice cores, Drill core analysis, Greenland

51-1277

Pio XI glacier: advances and retreats, and impact on climate during the present century. [El Glaciar Pio XI: avances y retrocesos, el impacto sobre su entorno durante el presente siglo]

Ibañez, A.R., *Revista geografica de Chile,* 1992, No.36, p.33-62, In Spanish with English summary. 16 refs.

Glaciology, Geomorphology, Glacier surveys, Glacier oscillation, Glacier tongues, Glacial lakes, Ice dams, Periodic variations, Chile—Campo de Hielo Sur

51-1278

Old ice in rock glaciers may provide long-term climate records.

Clark, D.H., Steig, E.J., Potter, N., Jr., Fitzpatrick, J., Updike, A.B., Clark, M., *Eos,* June 4, 1996, 77(23), p.217,221-222, 12 refs.

Rock glaciers, Paleoclimatology, Periglacial processes, Sedimentation, Ice cores, Drill core analysis, Ice composition, Dust, Isotope analysis, Stratigraphy, Geochronology

51-1279

Methane gas hydrate drilled at Blake Ridge.

ODP Leg 164 Shipboard Scientific Party, *Eos,* June 4, 1996, 77(23), p.219.

Marine geology, Oceanographic surveys, Bottom sediment, Drill core analysis, Temperature measurement, Stability, Hydrates, Natural gas, Geochemistry, Exploration, Atlantic Ocean

51-1280

Gas hydrates fuel diverse interests.

Carlowicz, M., *Eos,* June 4, 1996, 77(23), p.219.

Oceanographic surveys, Hydrates, Marine geology, Natural gas, Bottom sediment, Global change, Hydrocarbons, Natural resources

51-1281

Seismic images of crust beneath Iceland contribute to long-standing debate.

White, R.S., et al, *Eos,* May 21, 1996, 77(21), p.197,200-201, 7 refs.

Tectonics, Geological surveys, Earth crust, Marine geology, Geologic processes, Subpolar regions, Seismic surveys, Seismic reflection, Imaging, Profiles, Structural analysis, Iceland

51-1282

Physically based model of soil freezing in humid climates using air temperature and snow cover data.

DeGaetano, A.T., Wilks, D.S., McKay, M., *Journal of applied meteorology,* June 1996, 35(6), p.1009-1027, 24 refs.

Soil freezing, Freeze thaw cycles, Frost penetration, Thaw depth, Seasonal freeze thaw, Thermal diffusion, Snow cover effect, Snow depth, Saturation, Humidity, Mathematical models, Forecasting, Meteorological factors

51-1283

Inferring snow-breeze characteristics from frozen-lake breezes.

Segal, M., Kubesh, R., *Journal of applied meteorology,* June 1996, 35(6), p.1033-1039, 11 refs.

Wind (meteorology), Atmospheric boundary layer, Snow cover effect, Snow air interface, Ice air interface, Wind direction, Lake ice, Surface temperature, Simulation, Seasonal variations

51-1284

Ice near 0°C: radiolysis and absorbed dose calorimetry.

Klassen, N.V., *Radiation physics and chemistry,* Sep. 1996, 48(3), p.281-287, 34 refs.

Ice physics, Gamma irradiation, Radiation absorption, Photochemical reactions, Temperature measurement, Thermodynamics, Temperature effects, Carbon isotopes, Phase transformations, Heat flux, Degradation

51-1285

Proceedings.

Moderate Resolution Imaging Spectroradiometer (MODIS) Snow and Ice Workshop, Reston, VA, Sep. 13-14, 1995, Hall, D.K., ed, Greenbelt, National Aeronautics and Space Administration, 9509, 128p., NASA Conference Pub. 3318, Refs. passim. For selected papers see 51-1286 through 51-1301.

Remote sensing, Radiometry, Spaceborne photography, Snow surveys, Ice surveys, Sensor mapping, Snow cover distribution, Lake ice, Cloud cover, Optical properties, Sea ice distribution, Classifications, Resolution, Data processing, Meetings

51-1286

Remote sensing of snow in the cold regions.

Carroll, T.R., Moderate Resolution Imaging Spectroradiometer (MODIS) Snow and Ice Workshop, 1st, Reston, VA, Sep. 13-14, 1995. Proceedings. NASA Conference Pub. 3318, Greenbelt, National Aeronautics and Space Administration, 1995, p.3-14, 10 refs.

Snow surveys, Snow cover distribution, Remote sensing, Sensor mapping, Spaceborne photography, Aerial surveys, Snow hydrology, Snow water equivalent, Radiometry, Flood forecasting

51-1287

Satellite snow-cover mapping: a brief review.

Hall, D.K., Moderate Resolution Imaging Spectroradiometer (MODIS) Snow and Ice Workshop, 1st, Reston, VA, Sep. 13-14, 1995. Proceedings. NASA Conference Pub. 3318, Greenbelt, National Aeronautics and Space Administration, 1995, p.15-22, 27 refs.

Snow surveys, Snow cover distribution, Sensor mapping, Spaceborne photography, Radiometry, Image processing, Snow optics

51-1288

Interactive multisensor snow and ice mapping system.

Ramsay, B.H., Moderate Resolution Imaging Spectroradiometer (MODIS) Snow and Ice Workshop, 1st, Reston, VA, Sep. 13-14, 1995. Proceedings. NASA Conference Pub. 3318, Greenbelt, National Aeronautics and Space Administration, 1995, p.23-27.

Remote sensing, Snow surveys, Ice surveys, Snow cover distribution, Classifications, Sensor mapping, Radiometry, Data processing, Computer applications, Computer programs

51-1289

Use of satellite data for operational sea ice and lake ice monitoring.

Bertoia, C., Moderate Resolution Imaging Spectroradiometer (MODIS) Snow and Ice Workshop, 1st, Reston, VA, Sep. 13-14, 1995. Proceedings. NASA Conference Pub. 3318, Greenbelt, National Aeronautics and Space Administration, 1995, p.29-32.

Sea ice distribution, Lake ice, Ice surveys, Remote sensing, Synthetic aperture radar, Radiometry, Sensor mapping, Data processing, Image processing, Computer applications

51-1290

Monitoring Swiss Alpine snow cover variations using digital NOAA-AVHRR data.

Baumgartner, M.F., Holzer, T., Apfl, G., Moderate Resolution Imaging Spectroradiometer (MODIS) Snow and Ice Workshop, 1st, Reston, VA, Sep. 13-14, 1995. Proceedings. NASA Conference Pub. 3318, Greenbelt, National Aeronautics and Space Administration, 1995, p.33-37, 9 refs. For another source see 49-6569.

Alpine landscapes, Snow surveys, Snow cover distribution, Spaceborne photography, Radiometry, Sensor mapping, Snow line, Snow accumulation, Snowmelt, Seasonal variations, Runoff forecasting, Switzerland—Alps

51-1291

Mapping fractional snow covered area and sea ice concentrations.

Nolin, A.W., Moderate Resolution Imaging Spectroradiometer (MODIS) Snow and Ice Workshop, 1st, Reston, VA, Sep. 13-14, 1995. Proceedings. NASA Conference Pub. 3318, Greenbelt, National Aeronautics and Space Administration, 1995, p.39-49, 11 refs.

Geophysical surveys, Remote sensing, Snow cover distribution, Sea ice distribution, Sensor mapping, Radiometry, Radiance, Classifications, Detection, Image processing, Statistical analysis

51-1292

MODIS snow and ice algorithm development.

Riggs, G., Moderate Resolution Imaging Spectroradiometer (MODIS) Snow and Ice Workshop, 1st, Reston, VA, Sep. 13-14, 1995. Proceedings. NASA Conference Pub. 3318, Greenbelt, National Aeronautics and Space Administration, 1995, p.55-60.

Geophysical surveys, Snow surveys, Snow cover distribution, Sea ice distribution, Remote sensing, Radiometry, Sensor mapping, Reflectivity, Image processing, Data processing, Computer programs

51-1293

Analysis of the NOAA satellite-derived snow cover record, 1972-present.

Robinson, D.A., Frei, A., Moderate Resolution Imaging Spectroradiometer (MODIS) Snow and Ice Workshop, 1st, Reston, VA, Sep. 13-14, 1995. Proceedings. NASA Conference Pub. 3318, Greenbelt, National Aeronautics and Space Administration, 1995, p.61-65, 15 refs.

Geophysical surveys, Snow surveys, Snow cover distribution, Seasonal variations, Statistical analysis, Spaceborne photography, Radiometry, Sensor mapping, Charts

51-1294

Measurement of the spectral absorption of liquid water in melting snow with an imaging spectrometer.

Green, R.O., Dozier, J., Moderate Resolution Imaging Spectroradiometer (MODIS) Snow and Ice Workshop, 1st, Reston, VA, Sep. 13-14, 1995. Proceedings. NASA Conference Pub. 3318, Greenbelt, National Aeronautics and Space Administration, 1995, p.67-70, 6 refs.

Snow surveys, Snow hydrology, Spaceborne photography, Radiometry, Light transmission, Snowmelt, Meltwater, Snow optics, Radiation absorption, Optical properties, Spectra

51-1295

Estimating cloud and surface parameters at high latitudes with AVHRR data.

Key, J., Moderate Resolution Imaging Spectroradiometer (MODIS) Snow and Ice Workshop, 1st, Reston, VA, Sep. 13-14, 1995. Proceedings. NASA Conference Pub. 3318, Greenbelt, National Aeronautics and Space Administration, 1995, p.73-77, 10 refs.

Climatology, Air ice water interaction, Polar atmospheres, Cloud cover, Optical properties, Albedo, Detection, Spaceborne photography, Radiometry, Radiation balance, Models

51-1296

Potential MODIS applications for ice surface studies based on AVHRR experience.

Steffen, K., Moderate Resolution Imaging Spectroradiometer (MODIS) Snow and Ice Workshop, 1st, Reston, VA, Sep. 13-14, 1995. Proceedings. NASA Conference Pub. 3318, Greenbelt, National Aeronautics and Space Administration, 1995, p.79-80, 3 refs.

Remote sensing, Radiometry, Ice surveys, Sea ice distribution, Albedo, Ice conditions, Classifications, Models, Image processing

51-1297

Cloud masking and surface temperature distributions in the polar regions using AVHRR and other satellite data.

Comiso, J.C., Moderate Resolution Imaging Spectroradiometer (MODIS) Snow and Ice Workshop, 1st, Reston, VA, Sep. 13-14, 1995. Proceedings. NASA Conference Pub. 3318, Greenbelt, National Aeronautics and Space Administration, 1995, p.81-85, 7 refs.

Climatology, Polar atmospheres, Cloud cover, Sea ice, Ice temperature, Surface temperature, Spaceborne photography, Radiometry, Resolution, Image processing, Infrared reconnaissance

51-1298

Satellite mapping of Great Lakes ice cover.

Leshkevich, G.A., Moderate Resolution Imaging Spectroradiometer (MODIS) Snow and Ice Workshop, 1st, Reston, VA, Sep. 13-14, 1995. Proceedings. NASA Conference Pub. 3318, Greenbelt, National Aeronautics and Space Administration, 1995, p.87-91.

Geophysical surveys, Spaceborne photography, LANDSAT, Radiometry, Ice surveys, Lake ice, Ice detection, Albedo, Classifications, Sensor mapping, Resolution

51-1299

SNOWSAT—operational snow mapping in Norway.

Andersen, T., Moderate Resolution Imaging Spectroradiometer (MODIS) Snow and Ice Workshop, 1st, Reston, VA, Sep. 13-14, 1995. Proceedings. NASA Conference Pub. 3318, Greenbelt, National Aeronautics and Space Administration, 1995, p.101-102.

Snow surveys, Sensor mapping, Snow cover distribution, Spaceborne photography, Radiometry, Snowmelt, Models, Norway

51-1300

Multisensor analysis of satellite images for regional snow distribution.

Seidel, K., Ehrler, C., Martinec J., Moderate Resolution Imaging Spectroradiometer (MODIS) Snow and Ice Workshop, 1st, Reston, VA, Sep. 13-14, 1995. Proceedings. NASA Conference Pub. 3318, Greenbelt, National Aeronautics and Space Administration, 1995, p.103-110, 17 refs.

Watersheds, Geophysical surveys, Snow surveys, Snow hydrology, Snow cover distribution, Sensor mapping, Spaceborne photography, Radiometry, Snow water equivalent, Seasonal variations

51-1301

MODIS activities at the National Snow and Ice Data Center DAAC.

Scharfen, G.R., Moderate Resolution Imaging Spectroradiometer (MODIS) Snow and Ice Workshop, 1st, Reston, VA, Sep. 13-14, 1995. Proceedings. NASA Conference Pub. 3318, Greenbelt, National Aeronautics and Space Administration, 1995, p.111-115, 5 refs.

Organizations, Research projects, Snow surveys, Sea ice distribution, Snow cover distribution, Spaceborne photography, Radiometry, Computer programs

51-1302

Hydrographic and climatic changes influencing the proglacial Druzhby drainage system, Vestfold Hills, Antarctica.

Bronge, C., *Antarctic science*, Dec. 1996, 8(4), p.379-388, Refs. p.387-388.

Glacial geology, Limnology, Paleoclimatology, Climatic changes, Ablation, Glacier flow, Snowdrifts, Surface drainage, Meltwater, Water balance, Antarctica—Krok Lake, Antarctica—Vestfold Hills

Freshwater drainage systems, fed by melting of nearby inland ice and perennial snowdrifts, exist in the southeastern part of arid, ice-free, coastal Vestfold Hills. Most important is the complex Druzhby system. A water-balance was calculated for 1990-91. The system went through 4 seasonal phases of which only one displayed a fully developed external drainage. The relative duration of those phases can vary considerably from one year to another. The system depends critically on the water supply from ice-dammed Chelnok Lake. Exposed to excessive evaporation, the large Krok Lake could become internally drained and reach a new equilibrium in ca. 830 years. A Krok Lake sediment core can be interpreted as suggesting this occurred during the Holocene. The idea, inferred from striae, of a late Holocene Chelnok Glaciation reaching the northern shores of Krok Lake is questioned. Instead, it is suggested that the Chelnok striae originate from local basal melting of the ice sheet draining

southward into a deglaciated Sørsdal trough. At present, runoff is determined by opposing short and long-term climatic influences. (Auth. mod.)

51-1303

Mid to late Holocene readvance of the Law Dome ice margin, Budd Coast, East Antarctica.

Goodwin, I.D., *Antarctic science,* Dec. 1996, 8(4), p.395-406, Refs. p.405-406.

Glaciology, Glacier oscillation, Geochronology, Glacier mass balance, Glacial geology, Glacial deposits, Marine deposits, Geomorphology, Paleoecology, Antarctica—Law Dome

Glacial geological studies on the Windmill Is. and along the Budd Coast at the margin of the Law Dome indicate that the glacial extent of Law Dome has fluctuated during the Holocene. The morphology and structural geology of the present ice margin and Løken Moraines indicate that Law Dome has readvanced over part of the Windmill Is. since the culmination of the post-glacial retreat. Sedimentological and geochemical analyses show that Løken Moraines comprise reworked proglacial and coastal marine sediments and ice, which supports the morphological and structural evidence for a readvance. A chronology for the readvance is produced from relative lichenometry of Løken Moraines and coastal nunataks in conjunction with ^{14}C radiocarbon dates from the proglacial and coastal zones. The combined glaciological and geological evidence suggests that the readvance occurred after c. 4000 yr BP in response to a positive mass balance on Law Dome during the Holocene. (Auth.)

51-1304

Utilization of arctic river analogue studies in the interpretation of periglacial river sediments from southern Britain.

Bryant, I.D., Background to palaeohydrology—a perspective. Edited by K.J. Gregory, Bath, John Wiley & Sons, 1983, p.413-431, Refs. p.428-431.

DLC QE39.5.P27 B33

Pleistocene, River flow, Hydrology, Classifications, Sedimentation, Sediment transport, Geomorphology, Channels (waterways), Periglacial processes, Seasonal variations, Lithology, Stratigraphy, Lithology, United Kingdom—England

51-1305

Pre-Mesozoic stratigraphy and structure of Tuktoyaktuk Peninsula.

Wielens, J.B., *Canada. Geological Survey. Paper,* 1992, 90-22, 90p. + maps, With French summary. Refs. p.47-51.

Geological surveys, Tectonics, Pleistocene, Geologic structures, Stratigraphy, Boreholes, Drill core analysis, Well logging, Lithology, Classifications, Canada—Northwest Territories—Tuktoyaktuk Peninsula

51-1306

Cold acclimation and photoinhibition of photosynthesis in Scots pine.

Krivosheeva, A., et al, *Planta,* Nov. 1996, 200(3), p.296-305, Refs. p.303-305.

Grasses, Plants (botany), Acclimatization, Frost resistance, Photosynthesis, Light effects, Temperature effects, Cold weather tests, Luminescence, Photochemical reactions

51-1307

Geothermal systems in Iceland: structure and conceptual models. I. High-temperature areas.

Arnórsson, S., *Geothermics,* Oct.-Dec. 1995, 24(5-6), p.561-602, Refs. p.595-602.

Subpolar regions, Tectonics, Hydrothermal processes, Geothermy, Well logging, Temperature measurement, Hydrogeochemistry, Permeability, Magma, Convection, Heat sinks, Ground water, Iceland

51-1308

Geothermal systems in Iceland: structure and conceptual models. II. Low-temperature areas.

Arnórsson, S., *Geothermics,* Oct.-Dec. 1995, 24(5-6), p.603-629, Refs. p.627-629.

Subpolar regions, Tectonics, Geothermy, Hydrothermal processes, Ground water, Temperature measurement, Reservoirs, Temperature gradients, Permeability, Convection, Ice cores, Isotope analysis, Hydrogeochemistry, Iceland

51-1309

Role of stem recharge in reducing the winter desiccation of *Picea engelmannii* (Pinaceae) needles at alpine timberline.

Sowell, J.B., McNulty, S.P., Schilling, B.K., *American journal of botany,* Oct. 1996, 83(10), p.1351-1355, 27 refs.

Plant ecology, Forest ecosystems, Plant tissues, Desiccation, Forest lines, Moisture transfer, Water content, Hydraulics, Wind erosion, Cold weather tests, Sampling

51-1310

Structural development in ice cream—dynamic rheological measurements.

Goff, H.D., Freslon, B., Sahagian, M.E., Hauber, T.D., Stone, A.P., Stanley, D.W., *Journal of texture studies,* Dec. 1995, 26(5), p.517-536, 20 refs.

Frozen liquids, Rheology, Colloids, Low temperature tests, Freezing, Structural analysis, Stability, Viscoelasticity, Scanning electron microscopy, Microstructure, Temperature effects

51-1311

Mechanical damage induced by controlled freezing in apple and potato.

Khan, A.A., Vincent, J.F.V., *Journal of texture studies,* June 1996, 27(2), p.143-157, 16 refs.

Plant tissues, Porosity, Cryobiology, Freeze thaw cycles, Damage, Freezing rate, Temperature control, Penetration tests, Structural analysis, Microanalysis

51-1312

Did water vapor drive climate cooling?

Carlowicz, M., *Eos,* Aug. 13, 1996, 77(33), p.321-322.

Paleoclimatology, Climatic changes, Global change, Temperature variations, Atmospheric composition, Water vapor, Greenhouse effect, Moisture transfer, Cooling

51-1313

Sultry last interglacial gets sudden chill.

Maslin, M., *Eos,* Sep. 10, 1996, 77(37), p.353-354, 11 refs.

Paleoclimatology, Climatic changes, Global change, Ice sheets, Ice cores, Lacustrine deposits, Palynology, Sampling, Air temperature, Temperature variations, Correlation, Geochronology, Greenland

51-1314

Diagenesis and evolution of microporosity of Middle-Upper Devonian Kee Scarp reefs, Norman Wells, Northwest Territories, Canada: petrographic and chemical evidence.

Al-Aasm, I.S., Azmy, K.K., *AAPG bulletin,* Jan. 1996, 80(1), p.82-99, 44 refs.

Marine geology, Reservoirs, Geological surveys, Diagenesis, Sedimentation, Stratification, Lithology, Rock properties, Classifications, Porosity, Isotope analysis, Sampling, Canada—Northwest Territories—Norman Wells

51-1315

Glaciation and sea level—early research. [Vereisung und Meeresspiegel—Anfänge der Erforschung]

Seibold, E., Seibold, I., *Geologische Rundschau,* Sep. 1996, 85(3), p.403-408, In Germany with English summary. 50 refs.

Glaciology, Oceanography, Sea level, Glaciation, Glacier oscillation, Ice water interface, Theories, Geochronology, Accuracy

51-1316

Tectonics and climate.

Hay, W.W., *Geologische Rundschau,* Sep. 1996, 85(3), p.409-437, Refs. p.433-437.

Paleoclimatology, Atmospheric circulation, Tectonics, Geomorphology, Marine geology, Ocean currents, Climatic factors, Radiation balance, Glacier mass balance, Isostasy, —Drake Passage

Global tectonics and climate are both directly and indirectly related. The direct connection is between uplift, atmospheric circulation, and the hydrologic cycle. The indirect links are via subduction, volcanism, the introduction of gasses into the atmosphere, and through erosion and consumption of atmospheric gases by chemical weathering. An example of the tectonic influences on ocean circulation is given by reference to subantarctic Drake Passage. (Auth. mod.)

51-1317

Progressive intensification of northern hemisphere glaciation as seen from the North Pacific.

Maslin, M.A., Haug, G.H., Sarnthein, M., Tiedemann, R., *Geologische Rundschau,* Sep. 1996, 85(3), p.452-465, Refs p.462-465.

Oceanography, Paleoclimatology, Surface temperature, Marine deposits, Ice rafting, Paleoecology, Isotope analysis, Hydrologic cycle, Drill core analysis, Glaciation, Glacier formation, Geochronology, Pacific Ocean

51-1318

Reconstruction of atmospheric CO_2 from ice-core data and the deep-sea record of Ontong Java plateau: the Milankovitch chron.

Berger, W.H., Bickert, T., Yasuda, M.K., Wefer, G., *Geologische Rundschau,* Sep. 1996, 85(3), p.466-495, Refs. p.491-495.

Paleoclimatology, Marine deposits, Carbon dioxide, Geochronology, Sea level, Climatic changes, Isotope analysis, Ice sheets, Ice cores, Isotope analysis, Correlation, Antarctica—Vostok Station

The authors provide a reconstruction of atmospheric CO_2 from deep-sea sediments, for the past 625,000 years (Milankovitch chron). The database consists of a Milankovitch template of sea-level variation in combination with a unique data set for the deep-sea record for Ontong Java plateau in the western equatorial Pacific. Vostok Station ice-core data of Barnola et al. (1987) is re-dated. To make the reconstructions multiple regression between deep-sea data, on one hand, and ice-core CO_2 data in Antarctica, on the other are employed. The patterns of correlation suggest that the main factors controlling atmospheric CO_2 can be described as a combination of sea-level state and sea-level change. (Auth. mod.)

51-1319

Investigating the sensitivity of the atmospheric general circulation model ECHAM 3 to paleoclimatic boundary conditions.

Lorenz, S., Grieger, B., Helbig, P., Herterich, K., *Geologische Rundschau,* Sep. 1996, 85(3), p.513-524, 27 refs.

Paleoclimatology, Climatic changes, Global change, Temperature variations, Atmospheric circulation, Glaciation, Albedo, Radiation balance, Ice cover effect, Simulation, Models

51-1320

Late Quaternary sedimentation on the mid-Atlantic Reykjanes Ridge: clay mineral assemblages and depositional environment.

Gehrke, B., Lackschewitz, K.S., Wallrabe-Adams, H.J., *Geologische Rundschau,* Sep. 1996, 85(3), p.525-535, Refs. p.534-535.

Marine geology, Pleistocene, Ocean currents, Marine deposits, Clay minerals, Sedimentation, Quaternary deposits, Drill core analysis, X ray analysis, Grain size, Ice rafting, Atlantic Ocean

51-1321

Late Quaternary sediment dating and quantification of lateral sediment redistribution applying $^{230}Th_{ex}$: a study from the eastern Atlantic sector of the southern ocean.

Frank, M., Gersonde, R., van der Loeff, M.R., Kuhn, G., Mangini, A., *Geologische Rundschau,* Sep. 1996, 85(3), p.554-566, 39 refs.

Pleistocene, Paleoclimatology, Climatic changes, Oceanography, Quaternary deposits, Marine deposits, Sedimentation, Stratigraphy, Radioactive age determination, Geochronology, Correlation

High-resolution records of the natural radionuclide ^{230}Th were measured in sediments from the eastern Atlantic sector of the Antarctic Circumpolar Current to obtain a detailed reconstruction of the sedimentation history of this key area for global climate change during the late Quaternary. (Auth. mod.)

51-1322

Proceedings.

IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996, Beijing, Chinese Hydraulic Engineering Society, 1996, 823p. (2 vols.), Refs. passim. For individual papers see 51-1323 through 51-1430.

Sea ice, River ice, Ice control, Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice jams, Ice conditions, Ice forecasting, Offshore structures, Hydraulic structures

51-1323

Cyclic loading response of aligned first-year sea ice.

Cole, D.M., Johnson, R.A., Durell, G.D., MP 3922, IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.1-7, 16 refs.

Ice cover strength, Ice loads, Ice pressure, Ice friction, Ice elasticity, Ice deformation, Ice microstructure, Ice crystal structure, Dislocations (materials)

This paper presents methodology to determine the average shear stress resolved on the basal planes for ice polycrystals and demonstrates the validity of the analysis for core specimens of aligned first-year sea ice. Careful examination of the constitutive behavior of the ice using laboratory cyclic loading experiments revealed that the elastic and anelastic (time-dependent recoverable) strains varied systematically with the calculated orientation factor. Analysis employing a mechanistic model of the cyclic loading response shows very good agreement between theory and observation. The findings quantify an important link between the microstructure of first-year sea ice and its mechanical properties, and indicate that the anelastic behavior of sea ice can be largely explained by basal plane slip alone.

51-1324

Ice failure and ice loads on a conical structure—Kemi-I cone full scale ice force measurement data analysis.

Määttänen, M., Nortala-Hoikkanen, A., Avis, J., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.8-16, 11 refs.

Ice solid interface, Ice loads, Ice pressure, Ice friction, Ice cover strength, Ice deformation, Ice pileup, Ice breaking, Offshore structures, Finland

51-1325

JOIA project of study on ice load.

Saeki, H., et al, IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.17-27, 12 refs.

Ice solid interface, Ice loads, Ice pressure, Ice friction, Ice cover strength, Ice deformation, Offshore structures, Environmental tests, Research projects

51-1326

Ice conditions occur in China (briefing).

Li, G.F., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.30-38, 10 refs.

River ice, Ice conditions, Ice jams, Ice forecasting, Ice control, Flood control, Regional planning, Research projects, China

51-1327

Nonlinear fracture theories for freshwater and sea ice.

Mulmule, S.V., Adamson, R.M., Dempsey, J.P., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.39-46, 14 refs.

Ice cover strength, Ice creep, Ice deformation, Ice elasticity, Ice cracks, Crack propagation, Dislocations (materials), Stress concentration

51-1328

Primary study of determining the non-linear fracture toughness J-integral of fresh water ice by using photo-mechanics.

Li, F., Liu, W.P., Sun, X.T., Shen, W., Gong, D.Q., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.47-53, 4 refs.

Ice cover strength, Ice elasticity, Ice loads, Ice pressure, Ice deformation, Ice cracks, Ice optics, Dislocations (materials), Environmental tests

51-1329

Computational fracture mechanics analysis of flake formation in brittle ice.

Tuhkuri, J., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.54-61, 15 refs.

Ice cover strength, Ice loads, Ice solid interface, Ice pressure, Ice friction, Ice deformation, Ice cracks, Crack propagation

51-1330

Impact experiments on iceberg ice.

Gammon, P.H., Gagnon, R.E., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.62-71, 10 refs.

Icebergs, Ice strength, Ice solid interface, Ice loads, Ice pressure, Ice deformation, Ice cracks, Impact tests, Penetration tests

51-1331

Characteristics of unconfined compressive strength of sea ice in the Sea of Okhotsk.

Masaki, T., Okubo, Y., Honda, H., Otsuka, N., Saeki, H., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.72-79, 13 refs.

Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice density, Ice salinity, Ice cover thickness, Okhotsk Sea

51-1332

On the application of ice porosity in the analysis of ice compressive strength.

Li, Z.J., Wu, Z.W., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.80-85, 5 refs.

Ice cover strength, Ice pressure, Ice loads, Ice deformation, Ice density, Ice salinity, Porosity

51-1333

Thermomechanical constitutive equations for polycrystalline ice.

Schapery, R.A., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.86-93, 13 refs.

Ice cover strength, Ice loads, Ice pressure, Ice structure, Ice thermal properties, Ice elasticity, Ice creep, Ice deformation, Mathematical models

51-1334

3-D variability of sea ice uniaxial compressive strength.

Truskov, P.A., Surkov, G.A., Astaf'ev, V.N., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.94-101, 1 ref.

Ice cover strength, Ice loads, Ice pressure, Ice deformation, Compressive properties, Ultimate strength, Statistical analysis

51-1335

Large-scale in-situ arctic cyclic, creep-recovery and fracture measurements.

Adamson, R.M., Dempsey, J.P., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.102-109, 23 refs.

Ice cover strength, Ice loads, Ice pressure, Ice elasticity, Ice relaxation, Ice creep, Ice deformation, Ice cracks, Stress concentration

51-1336

Experimental study of the three-dimensional ice strength distribution.

Bekker, A.T., Seliverstov, V.I., Gomol'skiĭ, S.G., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.110-116, 7 refs.

Ice cover strength, Ice solid interface, Ice loads, Ice pressure, Ice deformation, Strain tests

51-1337

On kinked crack interactions in compression.

Wu, M.S., Niu, J., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.117-123, 7 refs.

Ice cover strength, Ice loads, Ice pressure, Ice friction, Ice deformation, Ice cracks, Crack propagation, Stress concentration, Dislocations (materials), Mathematical models

51-1338

Investigation of influence of boundary conditions on test results for cylindrical material samples.

Bekker, A.T., Gomol'skiĭ, S.G., Takhteev, V.A., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.124-130, 2 refs.

Ice cover strength, Ice loads, Ice pressure, Ice friction, Ice deformation, Stress strain diagrams, Strain tests, Boundary value problems, Mathematical models

51-1339

Stress-induced acoustic emissions in sea ice.

Langhorne, P.J., Haskell, T.G., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.131-141, 34 refs.

Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice creep, Ice cracks, Ice acoustics, Crack propagation, Stress strain diagrams

51-1340

NRC Centre of Ice/Structure Interaction: archiving Beaufort Sea data.

Timco, G.W., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.142-149, 11 refs.

Ice solid interface, Ice loads, Ice pressure, Ice friction, Ice cover strength, Ice deformation, Offshore structures, Artificial islands, Data processing, Beaufort Sea

51-1341

Arctic structure conceptual designs.

DeFranco, S.J., Blanchet, D., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.150-158, 14 refs.

Ice solid interface, Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice breaking, Ice pileup, Offshore structures, Steel structures, Caissons, Design criteria, Russia—Kara Sea

51-1342

Consideration on ice pressure in bridge design.

Wang, Z.K., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.159-165, 5 refs.

Ice solid interface, Ice cover strength, Ice loads, Ice pressure, Bridges, Design criteria, China

51-1343

Pressure-area relationships and calculation of global ice forces.

Jordaan, I.J., Fuglem, M.K., Matskevich, D.G., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.166-175, 13 refs.

Ice solid interface, Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice breaking, Statistical analysis

51-1344

Experimental study on ice forces on a conical structure using segmented models.

Kato, K., Adachi, M., Kishimoto, H., Ichikawa, T., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.176-183, 4 refs.

Ice solid interface, Ice cover strength, Ice loads, Ice pressure, Ice pileup, Ice deformation, Ice breaking, Offshore structures, Environmental tests

51-1345
Model tests of ice interaction with inclined and vertical structures in shallow water.
Li, Z.J., Riska, K., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.184-191, 8 refs.
Ice solid interface, Ice cover strength, Ice loads, Ice pressure, Ice friction, Ice deformation, Ice breaking, Offshore structures, Environmental tests

51-1346
Numerical simulation and analysis of ice engineering for the entrances of Huaneng-Yingkou Power Plant.
Sun, Y.W., Yu, Y.H., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.192-199.
Electric power, Water intakes, Ice loads, Ice control, Mathematical models, China—Liaodong Gulf

51-1347
Impact of sea ice on navigation in port.
Yang, X.H., Liu, G.H., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.200-202.
Ports, Ice cover effect, Ice navigation, China—Liaodong Gulf

51-1348
Global first-year ice loads: scale effect and non-simultaneous failure.
Blanchet, D., DeFranco, S.J., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.203-213, 27 refs.
Ice solid interface, Ice cover strength, Ice loads, Ice pressure, Ice pileup, Ice deformation, Ice breaking, Stress concentration, Offshore structures, Mathematical models

51-1349
Vertical ice loads acting on pile structures with various shapes of cross-sections due to changes in water levels.
Nishihata, A., Kioka, S., Nishimaki, H., Terashima, T., Saeki, H., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.214-221, 4 refs.
Ice solid interface, Ice cover strength, Ice loads, Ice pressure, Ice adhesion, Ice deformation, Water level, Piles, Mathematical models

51-1350
Forces between the river ice and the rockfill dike on the Sanxin shoal of Songhua River and its damage.
Wang, Y.C., Wang, Y.L., Zhang, Q.M., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.222-227.
River ice, Ice push, Ice jams, Ice loads, Ice erosion, Dredging, Channel stabilization, Levees, Rock fills, China—Songhua River

51-1351
Ice-structure interactions in medium scale field indentation tests.
Kawamura, M., et al, IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.228-236, 4 refs.
Ice solid interface, Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice breaking, Penetration tests, Strain tests, Offshore structures

51-1352
Further discussion of ice and frozen damage and its countermeasure in railway engineering.
Sun, Z.F., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.237-240.
Railroads, Bridges, Piers, Frost action, Frost protection, River ice, Ice loads, Ice control, China

51-1353
Comparison of methods for predicting thermally-induced ice loads.
Timco, G.W., Watson, D.A., Comfort, G., Abdelnour, R., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.241-248, 17 refs.
Ice solid interface, Ice loads, Ice pressure, Ice push, Ice thermal properties, Thermal expansion, Thermal stresses, Dams, Reservoirs

51-1354
Stability analysis and calculation of bank revetment of reservoir under ice pushing force.
Sun, J.M., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.249-252.
Ice loads, Ice pressure, Ice push, Ice erosion, Ice control, Reservoirs, Embankments, Bank protection (waterways), Slope stability

51-1355
Field observations of static ice loads on hydro-electric structures and the mechanisms producing them.
Comfort, G., Abdelnour, R., Gong, Y., Dinovitzer, A., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.253-260, 6 refs.
Ice solid interface, Ice loads, Ice pressure, Ice push, Ice thermal properties, Thermal expansion, Dams, Hydraulic structures

51-1356
Static ice loads on hydro-electric structures: analyses and predictive approaches.
Comfort, G., Abdelnour, R., Gong, Y., Dinovitzer, A., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.261-268, 3 refs.
Ice solid interface, Ice loads, Ice pressure, Ice push, Ice thermal properties, Thermal expansion, Dams, Hydraulic structures

51-1357
Winter construction on ice in over-river-bridge.
Wang, Z.K., Shen, J.Y., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.269-272, 2 refs.
Bridges, Piers, Pile driving, Cold weather construction, River ice, Ice cover effect, Ice control, Ice cutting, China—Harbin

51-1358
Ice forces on a wellhead jacket platform in the Bohai Sea.
Liu, L.M., Sun, Z.P., Wang, L.Y., Xu, J.Z., Song, A., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.273-281, 8 refs.
Offshore structures, Ice solid interface, Ice cover strength, Ice loads, Ice pressure, Ice pileup, Ice deformation, Ice breaking, Environmental tests, China—Bohai Sea

51-1359
Full scale ice force measurement on JZ20-2 platform.
Yue, Q.J., Bi, X.J., Sun, B.C., Zhang, T., Chen, X.Y., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.282-289, 16 refs.
Offshore structures, Ice solid interface, Ice cover strength, Ice loads, Ice pressure, Ice friction, Ice breaking, Ice control, Damping, Strain tests, China—Bohai Sea

51-1360
Estimating moving level ice thickness in Bohai Bay.
Yue, Q.J., Ji, S.Y., Bi, X.J., Zhang, T., Yun, C.F., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.290-295, 11 refs.
Ice cover thickness, Ice heat flux, Ice growth, Ice breakup, Drift, Ice models, Ice forecasting, China—Bohai Sea

51-1361
Detecting and tracing sea ice by marine radar on an oil platform.
Yue, Q.J., Bi, X.J., Zhang, T., Liu, C.H., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.296-301, 10 refs.
Sea ice distribution, Ice conditions, Drift, Ice detection, Ice reporting, Ice forecasting, Radar tracking, Offshore structures

51-1362
Stochastic process model of ice acting on upright column of marine platform and determination of model parameters.
Ou, J.P., Duan, Z.D., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.302-311, 12 refs.
Ice solid interface, Ice cover strength, Ice loads, Ice pressure, Ice friction, Ice deformation, Ice breaking, Offshore structures, Statistical analysis, Mathematical models

51-1363
Application of sea ice management system for winter production in Bohai oil fields.
Li, T.K., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.312-319, 5 refs.
Offshore drilling, Offshore structures, Sea ice distribution, Ice conditions, Ice reporting, Ice forecasting, Ice loads, Data processing, China—Bohai Sea

51-1364
Prediction mode of ice sheet maximum compressive strength in Liaodong Gulf.
Li, Z.J., Sui, J.X., Ding, D.W., Wu, Z.W., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.320-327, 14 refs.
Ice cover strength, Ice density, Ice salinity, Ice loads, Ice pressure, Ice deformation, Ice breaking, Stress strain diagrams, Ultimate strength, Statistical analysis, China—Liaodong Gulf

51-1365
Sea ice affecting port and ship operation in China.
Chen, Y.F., Qu, C.Z., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.328-334.
Ports, Ice conditions, Ice cover effect, Ice navigation, Ice reporting, Ice control, China—Bohai Sea

51-1366
Mathematical model of the ridge.
Kapustianskiĭ, S., Shkhinek, K.N., Kärnä, T., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.335-345, 20 refs.
Ice cover strength, Ice loads, Ice pressure, Ice elasticity, Ice density, Ice breaking, Ice deformation, Pressure ridges, Porosity, Mathematical models

51-1367

Interactions between sea ice and sandy sea bottoms.

Kioka, S., Terai, Y., Masaki, T., Nishimaki, H., Saeki, H., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.346-352, 3 refs.

Ice floes, Ice bottom surface, Ice loads, Ice pressure, Ice friction, Ice scoring, Ice erosion, Ocean bottom, Environmental tests, Mathematical models

51-1368

Thermo-hydraulic modeling of cooling water circulation with icing simulation.

Chen, H.Q., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.353-360, 5 refs.

Nuclear power, Cooling systems, Water intakes, Ice formation, Ice heat flux, Ice accretion, Ice loads, Ice control, Thermal pollution, Heat recovery, Cold weather operation, Mathematical models

51-1369

Uniform ice regions of the Barents Sea.

Mironov, E.IU., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.361-368, 11 refs.

Ice surveys, Sea ice distribution, Ice conditions, Ice edge, Polynyas, Barents Sea

51-1370

Modelling of ice flowing and melting for cooling water engineering in estuary.

Zeng, P., Duan, J.H., Huang, Z.C., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.369-377, 8 refs.

Electric power, Water intakes, Cooling systems, Estuaries, Drift, Ice water interface, Ice loads, Ice control, Heat recovery, Artificial melting, Mathematical models

51-1371

Model of pollutant propagation under ice cover in the tidal estuary.

Debol'skaia, E.I., Debol'skiĭ, V.K., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.378-382, 2 refs.

Estuaries, Tidal currents, River flow, Sewage, Water pollution, Ice water interface, Ice cover effect, Mathematical models

51-1372

Measures to provide the safe operation of tidal power plant structures under severe ice conditions (with an example of the Tugurskaya Tidal Power Plant).

Karnovich, V.N., Vasilevskiĭ, A.G., Tregub, G.A., Shatalina, I.N., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.383-386, 4 refs.

Electric power, Tidal currents, Hydraulic structures, Ice cover effect, Ice loads, Ice control, Russia—Tugur

51-1373

Experimental study of ice loads on conical structures.

Ohta, M., Ishikawa, S., Kawasaki, T., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.387-394, 7 refs.

Ice solid interface, Ice cover strength, Ice loads, Ice pressure, Ice friction, Ice deformation, Ice breaking, Offshore structures, Environmental tests

51-1374

Ice force as a function of structural compliance.

Kamesaki, K., Yamauchi, Y., Kärnä, T., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.395-402, 14 refs.

Ice solid interface, Ice cover strength, Ice loads, Ice pressure, Ice friction, Ice deformation, Ice breaking, Offshore structures, Environmental tests

51-1375

Numerical simulation of ice transport over the Lake Erie-Niagara River ice boom.

Lu, S.N., Shen, H.T., Crissman, R.D., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.403-411, 8 refs.

Lake ice, River ice, Ice breakup, Ice jams, Ice loads, Ice forecasting, Ice control, Ice booms, Computerized simulation, Niagara River

51-1376

Simulation of ice processes for open channel systems.

Yang, K.L., Yang, X.Q., Liu, Z.P., Gao, J.Z., Li, G.F., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.412-421, 5 refs.

River ice, Ice formation, Freezeup, Ice growth, Ice deterioration, Ice breakup, Ice forecasting, Ice water interface, Ice cover effect, River flow, Mathematical models

51-1377

Mathematical model of ice jam formation in river beds.

Debol'skaia, E.I., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.422-427, 1 ref.

River ice, Ice breakup, Ice jams, Ice water interface, Ice cover effect, River flow, Mathematical models

51-1378

Analog of river sedimentation to river ice processes with a two-phase flow analysis.

Wei, L.Y., Li, Z.R., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.428-435, 15 refs.

River ice, Frazil ice, Ice jams, Ice water interface, Ice cover effect, River flow, Suspended sediments, Alluvium, Sediment transport, Mathematical models

51-1379

Siltation calculation and numerical simulation of iced river mouth.

Li, B., Zhang, Z., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.436-441.

River ice, Icebound rivers, Ice water interface, Ice cover effect, Deltas, Estuaries, Tides, Suspended sediments, Alluvium, Bottom sediment, Sediment transport, Mathematical models

51-1380

Variation of the heat exchange coefficient at the ice-water interface during winter.

Holder, G.K., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.442-451, 12 refs.

River ice, Ice bottom surface, Ice water interface, Ice heat flux, Ice cover effect, Heat transfer coefficient, Mathematical models

51-1381

Characteristics and present forecasting situation of the ice dam on the upper reaches of the Heilong River.

Liu, M., Hu, H.D., Wang, J.H., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.452-460, 2 refs.

River ice, Ice dams, Ice jams, Ice conditions, Ice forecasting, Flood forecasting, Statistical analysis, China—Heilongjiang Province, Russia—Amur River

51-1382

Sediment-transporting study for the ice-period reservoir.

Bai, S.L., Ma, X.X., Wang, H.L., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.461-471, 6 refs.

River ice, Ice jams, Ice water interface, Ice cover effect, River flow, Suspended sediments, Alluvium, Sediment transport, Reservoirs, Mathematical models, China—Yellow River

51-1383

Flow characteristics and ice sluicing at the river bend.

Hou, J., Zhou, Z., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.472-479, 2 refs.

River ice, Ice control, Sluices (hydraulic engineering), Hydraulic structures, River flow, Flow control

51-1384

Interaction between ice and water flow in rapids.

Tesaker, E., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.480-487, 6 refs.

River ice, Ice jams, Ice dams, Bottom ice, Ice water interface, Ice cover effect, River flow

51-1385

Formation of frazil and anchor ice.

Yamazaki, M., Hirayama, K., Sakai, S., Sasamoto, M., Kiyohara, M., Takiguchi, H., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.488-496, 3 refs.

River ice, Ice formation, Frazil ice, Bottom ice

51-1386

Resistance of ice-covered nature flows.

Dolgopolova, E.N., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.497-504, 24 refs.

Icebound rivers, River ice, Ice water interface, Ice cover effect, River flow

51-1387

Study of snow flow gutter.

Yamashita, S., Sakai, S., Sasamoto, M., Hirayama, K., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.505-510, 7 refs.

Snow removal, Drains, Channels (waterways), Water flow

51-1388

Ice problems during 25 years of operation of hydraulic project Włocławek on Vistula River.

Majewski, W., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.511-518, 5 refs.

River ice, Ice conditions, Ice jams, Frazil ice, Ice control, Flood control, Reservoirs, Earth dams, Spillways, Hydraulic structures, Poland

51-1389

Ice conditions on the downstream of Xigou Reservoir, the Gongbiela River.

Yang, X.Q., Xiao, D.F., Zhu, W.S., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.519-526.

River ice, Ice conditions, Ice control, Flood control, Reservoirs, Electric power, China—Heilongjiang Province

51-1390

Method of projection pursuit regression in the ice-jam flood prediction.

Zheng, Z.G., Yang, L.X., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.527-531, 5 refs.

River ice, Ice jams, Ice forecasting, Flood forecasting, Statistical analysis

51-1391

Outbursting ice-jam flood of Sikeshu River in winter in Xinjiang.

Yang, L.X., Zheng, Z.G., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.532-536, 1 ref.

River ice, Ice jams, Ice dams, Ice forecasting, Lake bursts, Flood forecasting, China—Tian Shan

51-1392

Summary of solving ice problems by model experiments.

Chen, C.J., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.537-545, 9 refs.

River ice, Ice jams, Ice loads, Ice control, Electric power, Hydraulic structures, Environmental tests

51-1393

Outburst conditions of glacial terminal moraine lake and flood estimation of the Nianchu River.

Chen, C.J., Liu, M., Zhang, Z., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.546-553, 6 refs.

Glacial lakes, Moraines, Lake bursts, Flood forecasting, China—Xizang, Himalaya Mountains

51-1394

Ice prevention and ice release at the backwater headwork of dam.

Xu, S.B., Liang, X.L., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.554-559, 1 ref.

River ice, Ice control, Dams, Hydraulic structures

51-1395

Ice conditions on the upper and middle Heilongjiang River.

Yan, S.R., Dong, Z.L., Sun, S.S., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.560-567, 5 refs.

River ice, Ice conditions, Ice jams, Ice dams, Ice control, Flood control, China—Heilongjiang Province, Russia—Amur River

51-1396

Dispatching optimization for winter operation of the Xigou Hydropower Plant.

Xiao, D.F., Zhu, D.Z., Wen, S.S., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.568-576.

River ice, Ice control, Flood control, Electric power, Dams, Reservoirs, China—Heilongjiang Province

51-1397

Remote measurements of ice jam thickness profiles.

Beltaos, S., Ford, J.S., Burrell, B.C., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.577-584, 8 refs.

River ice, Ice surveys, Ice jams, Ice cover thickness, Ice bottom surface, Radio echo soundings, Thickness gages, Telemetering equipment

51-1398

Measures of ice discharging and implementation during diversion construction period of Lianhua Hydropower Station on the Mudan River.

Duan, Y.S., Yang, X., Zhu, C.X., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.585-592.

River ice, Ice control, River flow, Flow control, Electric power, Tunnels, China—Heilongjiang Province

51-1399

Experimental study of ice-sluicing structures in Xinjiang's diversion canal type hydro-electric power stations.

Hou, J., Zhou, Z., Hui, Y.J., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.593-601, 4 refs.

River ice, Ice control, River flow, Flow control, Hydraulic structures, Sluices (hydraulic engineering), Electric power, China—Xinjiang

51-1400

Field survey of an ice jam in the Hassamu River and a comparison with the results of a model test.

Hara, F., Kawai, T., Imaizumi, A., Saeki, H., Yamaguchi, H., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.602-609, 4 refs.

River ice, Ice jams, Ice loads, Floods, Accidents, Bridges, Environmental tests, Japan—Hokkaido

51-1401

Preliminary studies of the winter water transfer problems: the west route diversion works from the Yangtze River to Yellow River in China.

Gao, Z.D., Zhang, Z.H., Ma, G.A., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.610-617.

River ice, Ice control, River flow, Flow control, Route surveys, Channels (waterways), Hydraulic structures, China

51-1402

Research observation on open channel water conveyance under ice covers.

Li, S.Z., Xu, G.L., Yu, H.T., Li, W.M., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.618-625, 4 refs.

River ice, Ice jams, Ice water interface, Ice cover effect, Ice control, Channels (waterways), River flow, Flow control, China

51-1403

Ice in spillways and tunnels. Part I: problems and physics.

Lia, L., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.626-632, 6 refs.

Tunnels, Spillways, Hydraulic structures, Ice formation, Ice accretion, Ice loads, Ice control, Heat transfer

51-1404

Ice in spillways and tunnels. Part II: calculations and measurements.

Lia, L., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.633-640, 2 refs.

Tunnels, Spillways, Hydraulic structures, Ice formation, Ice accretion, Ice loads, Ice control, Electrical logging, Temperature measurement

51-1405

Study of stability of winter water-transfer in steep gradient canals.

Zheng, G.H., Li, Q., Huang, H.Y., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.641-646, 2 refs.

Channels (waterways), Hydraulic structures, Ice control, Ice water interface, Water flow, Flow control, Mathematical models

51-1406

Influence of Heilongjiang river system icicle upon the hydraulic structures.

Yin, D.X., Li, W., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.647-650.

River ice, Ice needles, Frazil ice, Ice jams, Ice loads, Ice control, Accidents, Hydraulic structures, China—Heilongjiang Province

51-1407

Study on ice problems related to hydraulic projects in Liaoning Province.

Li, D.R., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.651-658, 2 refs.

River ice, Ice conditions, Ice loads, Ice pressure, Ice control, Hydraulic structures, Earth dams, Rock fills, China—Liaoning Province

51-1408

Design method for ice conveyance canal of diversion type of power plant.

Rouzi, T., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.659-666, 7 refs.

River ice, Ice jams, Ice loads, Ice control, Channels (waterways), Hydraulic structures, Electric power, China—Xinjiang

51-1409

Introduction of ice regime in the Yellow River.

Ke, S.J., Lu, G.Q., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.667-674, 5 refs.

River ice, Ice conditions, Ice jams, Ice dams, Ice cover effect, Ice forecasting, Ice control, Flood forecasting, Flood control, China—Yellow River

51-1410

Change of ice regime in the Yellow River after reservoirs build in the master stem.

Ke, S.J., Chen, Z.T., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.675-682, 4 refs.

River ice, Ice conditions, Freezeup, Ice breakup, Ice control, Ice forecasting, Ice cover effect, River flow, Reservoirs, Flood forecasting, Flood control, China—Yellow River

51-1411

Computation of water stage and discharge in the lower Yellow River at frozen period using hydrological method.

Chen, Z.T., Ke, S.J., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.683-691, 9 refs.

River ice, Ice conditions, Freezeup, Ice breakup, Ice jams, Ice forecasting, Ice cover effect, River flow, Flood forecasting, Mathematical models, China—Yellow River

51-1412

Study on the developing models of the ice prevention decision-making supporting system of the Yellow River.

Cai, L., Wei, X.Y., Cai, B., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.692-700, 4 refs.

River ice, Ice conditions, Ice forecasting, Ice control, Flood forecasting, Computerized simulation, China—Yellow River

51-1413

Prevention and control of the ice flood at the lower reaches of the Yellow River.

Bao, Y.F., Bao, X.C., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.701-706.

River ice, Ice jams, Ice control, Ice cover effect, Flood control, China—Yellow River

51-1414

Ice regimes and its research on upstream of the Yellow River.

Yang, L.F., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.707-714, 2 refs.

River ice, Ice conditions, Ice jams, Ice forecasting, Ice control, Ice cover effect, Flood forecasting, Flood control, China—Yellow River

51-1415

Ice characteristic in the river that flows northward and forecasting model.

Wang, N., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.715-720.

River ice, Ice conditions, Freezeup, Ice breakup, Ice forecasting, Computerized simulation

51-1416

Simulation and analysis of ice conditions in the lower Yellow River.

Wang, D.S., Shen, H.T., Zhu, Q.P., Huo, S.Q., Li, Z.X., Wang, Z.L., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.721-728, 9 refs.

River ice, Ice conditions, Ice jams, Ice forecasting, Ice control, River flow, Flood forecasting, Flood control, Reservoirs, Computerized simulation, China—Yellow River

51-1417

Cold wave analysis and river freeze forecast in the lower reaches of the Yellow River.

Yang, S.Q., Liu, X.H., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.729-736.

River ice, Ice conditions, Freezeup, Frost forecasting, Ice forecasting, Flood forecasting, Computerized simulation, China—Yellow River

51-1418

Assessment of the ice damage mitigation measures at Haibowan Reservoir in Inner Mongolia section of Yellow River.

Zhang, Z.H., Gao, Z.D., Du, H.Q., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.737-742, 6 refs.

River ice, Ice conditions, Ice forecasting, Ice control, River flow, Flow control, Flood forecasting, Flood control, Reservoirs, China—Inner Mongolia, China—Yellow River

51-1419

Ice rope preventing ice flood on the lower Yellow River.

Cheng, Y.J., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.743-747, 2 refs.

River ice, Ice control, Flood control, Ice booms, Cables (ropes), China—Yellow River

51-1420

Bearing capacity of floating ice sheets.

Honda, H., Okubo, Y., Terashima, T., Saeki, H., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.748-755, 4 refs.

Ice cover strength, Ice loads, Ice (construction material), Ice deformation, Ice cracks, Bearing strength

51-1421

Approach to the engineering research on the ice prevention of water intakes.

He, Y.Y., Zhang, L.J., Li, Q.J., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.756-764, 7 refs.

Water intakes, River ice, Frazil ice, Ice loads, Ice control, Electric power, Heat recovery, Artificial melting

51-1422

Protect for ice of the steel gate in reservoir.

Zheng, B.M., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.765-768, 3 refs.

Reservoirs, Hydraulic structures, Sluices (hydraulic engineering), Ice loads, Ice control, Electric heating, Conduction

51-1423

Movement of ice blocks under an ice cover.

Hara, F., Kawai, T., Hanada, M., Nishihata, A., Saeki, H., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.769-778, 3 refs.

River ice, Ice jams, Ice cover effect, Ice friction, Environmental tests

51-1424

Present situation and prospects for ice breaking technique.

Ao, B.J., Su, Q.S., An, Z.C., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.779-783.

River ice, Lake ice, Ice breaking, Ice cutting, Augers, Caissons, Hydraulic jets, Artificial melting

51-1425

Design of rotary-grill trash eliminating and ice removing machine.

Tiehan, IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.784-791, 2 refs.

River ice, Ice control, Ice removal, Electric power, Water intakes, Sluices (hydraulic engineering), Hydraulic structures, China

51-1426

Study and design on method of jet flow of pressure water in ice and frost prevention.

Tiehan, IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.792-798, 4 refs.

Reservoirs, Hydraulic structures, Hydraulic jets, Bubbling, River ice, Ice prevention, Ice control, China

51-1427

Damages of ice slush to harbor and navigation works and their protective measures.

Wang, Y.L., Wang, G.J., Zhang, Q.M., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.799-806, 5 refs.

River ice, Frazil ice, Ice conditions, Ice loads, Ice control, Hydraulic structures, China—Heilongjiang Province

51-1428

Analysis of correlative factors of frost heaving amount of frozen soil in seasonally frozen area of Heilongjiang Province.

Wang, X.R., Li, H.R., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.807-810, 2 refs.

Irrigation, Channels (waterways), Culverts, Soil freezing, Frost heave, Frost penetration, Frost forecasting, Frost protection, Statistical analysis, China—Heilongjiang Province

51-1429

Ice conditions and their influence on water project in Xizang Plateau.

Liu, T.C., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.811-818.

River ice, Ice conditions, Diurnal variations, Ice forecasting, Ice cover effect, Electric power, Hydraulic structures, China—Xizang

51-1430

Damage of frost heaving and its preventive measures in a seasonal frost zone.

Han, X.K., Zhao, Z.M., Huang, X.X., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.2, Beijing, Chinese Hydraulic Engineering Society, 1996, p.819-823.

Channels (waterways), Hydraulic structures, Soil freezing, Frost heave, Frost protection, Cold weather construction, China—Tarim Basin

51-1431

Significant progress leads to new LAII long-range plan.

Weller, G., Anderson, P.A., *Witness the Arctic,* 1996, 4(3), p.1-2.

Research projects, Ecosystems, Geophysical surveys, Soil air interface, Air ice water interaction, Human factors, Long range forecasting

51-1432

GISP2 investigators focus on disseminating results. *Witness the Arctic,* 1996, 4(3), p.7.

Ice sheets, Ice cores, Sampling, Research projects, Greenland

51-1433

Eight nations sign declaration establishing Arctic Council. *Witness the Arctic,* 1996, 4(3), p.8.

Research projects, International cooperation, Environmental protection, Economic development

51-1434

Quaternary exposures near Baltringen/Riss and the stratigraphic division of the Riss-complex—new stratigraphical, pedological and geochronological aspects. [Quartärufschulüsse bei Baltringen/Riß und Gliederung des Riß-Komplexes—neue stratigraphische, pedologische und geochronologie Aspekte]

Miara, S., Zöller, L., Rögner, K., Rousseau, D.D., *Zeitschrift für Geomorphologie*, June 1996, 40(2), p.209-226, In German with English and French summaries. 28 refs.

Pleistocene, Paleoclimatology, Eolian soils, Loess, Moraines, Quaternary deposits, Paleoecology, Stratigraphy, Geochronology, Sampling, Profiles, Germany, Switzerland

51-1435

SFM studies of the surface morphology of ice.

Nickolayev, O., Petrenko, V., Symposium on Evolution of Thin Film and Surface Structure and Morphology, Boston, MA, Nov. 28-Dec. 2, 1994. Proceedings. Materials Research Society Proceedings. Vol.355, Pittsburgh, Materials Research Society, 1995, p.221-226, 21 refs.

DLC QC176.82.E96

Ice physics, Ice surface, Surface properties, Lasers, Imaging, Water films, Ice water interface, Ice adhesion, Temperature effects, Ice dielectrics

51-1436

Studies of alpine permafrost in central Asia I—northern Tian Shan.

Qiu, G.Q., ed, Gorbunov, A.P., ed, Yakutsk, Russian Academy of Sciences. Permafrost Institute, 1993, 79p., With Russian and Chinese summaries. Refs. passim. For individual papers see 51-1437 through 51-1447.

Permafrost distribution, Frozen ground mechanics, Geocryology, Alpine landscapes, Paleoclimatology, Paleoclimatology, Paleoclimatology, Permafrost thermal properties, Permafrost surveys, China—Tian Shan

51-1437

Comparison: development conditions of frozen ground in the Bolshaia Almatinka Kosmo Permafrost Station, (Kazakhstan) and the Tianshan Glaciological Station (China).

Qiu, G.G., Gorbunov, A.P., Studies of alpine permafrost in central Asia I—northern Tian Shan, Yakutsk, Russian Academy of Sciences. Permafrost Institute, 1993, p.9-15, With Russian and Chinese summaries. 10 refs.

Alpine landscapes, Mountain soils, Permafrost distribution, Permafrost origin, Soil freezing, Frozen ground mechanics, Periglacial processes, Snow cover effect, Climatic factors, Kazakhstan, China—Tian Shan

51-1438

Permafrost and pereletoks in the forest belt of the Tian Shan.

Gorbunov, A.P., Studies of alpine permafrost in central Asia I—northern Tian Shan, Yakutsk, Russian Academy of Sciences. Permafrost Institute, 1993, p.16-22, With Russian and Chinese summaries. 7 refs.

Alpine landscapes, Permafrost distribution, Forest ecosystems, Pereletoks, Solifluction, Environmental impact, China—Tian Shan

51-1439

Distribution of thermal regime of alpine permafrost of the middle section of East Tian Shan, China.

Jin, H.J., Qiu, G.Q., Zhao, L., Wang, S.J., Studies of alpine permafrost in central Asia I—northern Tian Shan, Yakutsk, Russian Academy of Sciences. Permafrost Institute, 1993, p.23-29, With Russian and Chinese summaries. 5 refs.

Alpine landscapes, Permafrost surveys, Permafrost distribution, Thermal regime, Seasonal freeze thaw, Soil temperature, Isotherms, Boreholes, Frozen ground thermodynamics, Permafrost thermal properties, Cryogenic structures, Classifications, Hydrogeology, China—Tian Shan

51-1440

Comparative characteristics of icings in the Zailiiskiĭ Alatau and East Tian Shan.

Gorbunov, A.P., Ermolin, E.D., Studies of alpine permafrost in central Asia I—northern Tian Shan, Yakutsk, Russian Academy of Sciences. Permafrost Institute, 1993, p.30-35, With Russian and Chinese summaries. 8 refs.

Permafrost hydrology, Subpermafrost ground water, Geocryology, Glacial hydrology, Soil freezing, Icing, Classifications, Distribution, Geomorphology, China—Tian Shan

51-1441

Some new data of D.C. electrical soundings of permafrost in the northern Tian Shan.

Zeng, Z.G., Wang, S.J., Nemov, A.E., Studies of alpine permafrost in central Asia I—northern Tian Shan, Yakutsk, Russian Academy of Sciences. Permafrost Institute, 1993, p.36-41, With Russian and Chinese summaries. 5 refs.

Permafrost surveys, Alpine landscapes, River basins, Electrical resistivity, Sounding, Permafrost thickness, Permafrost distribution, China—Tian Shan

51-1442

Depositional characteristics of sediments of the Urumqi River, Tian Shan, China.

Zhao, L., Qiu, G.G., Studies of alpine permafrost in central Asia I—northern Tian Shan, Yakutsk, Russian Academy of Sciences. Permafrost Institute, 1993, p.42-44, With Russian and Chinese summaries. 2 refs.

Alpine landscapes, Quaternary deposits, Boreholes, Sedimentation, Glacial deposits, Lithology, Stratigraphy, China—Tian Shan

51-1443

Rock glaciers of the Bolshaia Almatinka River basin (northern Tian Shan) and the Urumqi River basin (eastern Tian Shan).

Gorbunov, A.P., Titkov, S.N., Studies of alpine permafrost in central Asia I—northern Tian Shan, Yakutsk, Russian Academy of Sciences. Permafrost Institute, 1993, p.45-48, With Russian and Chinese summaries. 5 refs.

River basins, Rock glaciers, Periglacial processes, Sediment transport, Slope processes, Classifications, China—Tian Shan, China—Urumqi River

51-1444

Comparative characteristics of frost-heaving features in the ranges of Zailiiskiĭ Alatau, Kalaucheng and Bogdashan.

Titkov, S.N., Zhao, L., Jin, H.J., Studies of alpine permafrost in central Asia I—northern Tian Shan, Yakutsk, Russian Academy of Sciences. Permafrost Institute, 1993, p.49-53, With Russian and Chinese summaries. 2 refs.

Alpine landscapes, Discontinuous permafrost, Geocryology, Frost heave, Frost mounds, Pingos, Periglacial processes, Snow cover effect, Geomorphology, China—Tian Shan, Kazakhstan—Zailiyskiy Alatau

51-1445

Permafrost and climate at the upper reach of Urumqi River, (Tian Shan, China) during the past 15,000 years.

Zhao, L., Qiu, G.Q., Jin, H.J., Studies of alpine permafrost in central Asia I—northern Tian Shan, Yakutsk, Russian Academy of Sciences. Permafrost Institute, 1993, p.54-60, With Russian and Chinese summaries. 16 refs.

River basins, Alpine landscapes, Permafrost distribution, Permafrost indicators, Paleoclimatology, Snow line, Quaternary deposits, Sedimentation, Periglacial processes, Lithology, China—Tian Shan, China—Urumqi River

51-1446

Development conditions of the polygonal soil-wedge system in the Zailiiskiĭ Alatau.

Gorbunov, A.P., Ermolin, E.D., Zeng, Z.G., Qiu, G.Q., Studies of alpine permafrost in central Asia I—northern Tian Shan, Yakutsk, Russian Academy of Sciences. Permafrost Institute, 1993, p.61-65, With Russian and Chinese summaries.

Geocryology, Patterned ground, River basins, Meadow soils, Soil freezing, Frost action, Wedges, Frost action, Cracking (fracturing), Permafrost indicators, China—Tian Shan, Kazakhstan—Zailiyskiy Alatau

51-1447

Pollen composition and its significance in the reconstruction of paleoclimate in northern Tian Shan during the past 5000 years.

Ma, Y.Z., Qiu, G.Q., Zhao, L., Studies of alpine permafrost in central Asia I—northern Tian Shan, Yakutsk, Russian Academy of Sciences. Permafrost Institute, 1993, p.66-73, With Russian and Chinese summaries. 7 refs.

Paleoclimatology, Paleoecology, Palynology, Alpine landscapes, Meadow soils, Frost action, Patterned ground, Wedges, Stratigraphy, China—Tian Shan

51-1448

Assessment of climate variability of the Greenland ice sheet: integration of in situ and satellite data.

Steffen, K., et al, Colorado. University. Cooperative Institute for Research in Environmental Sciences. Annual progress report to National Aeronautics and Space Administration. No.NAGW-2158, Boulder, Apr. 1995, 39p., 29 refs.

Climatology, Ice sheets, Glacier surveys, Snow surveys, Glacier mass balance, Glacier oscillation, Radiation balance, Radiometry, Albedo, Snow cover effect, Snowmelt, Snow optics, Seasonal variations, Greenland

51-1449

Freeze-thaw cycling and cold temperature effects on geomembrane sheets and seams.

Comer, A.I., Hsuan, Y.G., U.S. Department of Interior. Bureau of Reclamation. Materials Engineering and Research Laboratory Group. Report R-96-03, Denver, Mar. 1996, 136p., 10 refs.

Cold weather operation, Storage tanks, Linings, Polymers, Synthetic materials, Mechanical tests, Cold chambers, Stress concentration, Tensile properties, Freeze thaw tests, Temperature effects

51-1450

Quaternary glacial history of the Lahul Himalaya, northern India.

Owen, L.A., Derbyshire, E., Richardson, S., Benn, D.I., Evans, D.J.A., Mitchell, W.A., *Journal of quaternary science*, Jan.-Feb. 1996, 11(1), p.25-42, 35 refs.

Geomorphology, Mountain glaciers, Paleoclimatology, Glacial geology, Glacier oscillation, Glacial erosion, Moraines, Tectonics, Quaternary deposits, Geochronology, Geophysical surveys, India—Lahul Himalaya

51-1451

Downfall of symmetry? Snowflakes's imperfect whirl.

Amato, I., *Washington Post*, Dec. 23, 1996, No.18, p.A3.

Snow physics, Snow optics, Snow crystal structure, Ice microstructure, Scanning electron microscopy, Imaging, Resolution

51-1452

Estimating snowmelt contribution to the seasonal water balance in a small alpine watershed.

Ingersoll, G.P., University of Colorado, 1995, 137p., MS. thesis. Refs. p.131-136.

Snow hydrology, Snowmelt, Watersheds, Alpine landscapes, Snow surveys, Water balance, Snow water equivalent, Snow depth, Snow density, Snow evaporation, Snow cover distribution, Stream flow, Seasonal variations, Correlation, Runoff forecasting

51-1453
Arctic Research of the United States, Vol.10, spring/summer 1996.
Myers, C.E., ed, Haugh, J., ed, Cate, D.W., ed, 123p.
Research projects, Oceanography, Climatology, Glaciology, Ecosystems, Geophysical surveys, Environmental protection, Marine biology, Cost analysis

51-1454
ERS scatterometer land applications: detecting soil thawing in Siberia.
Boehnke, K., Wismann, V.R., *Earth observation quarterly,* June 1996, No.52, p.4-7, 7 refs.
Remote sensing, Climatology, Spacecraft, Radar echoes, Backscattering, Soil surveys, Sensor mapping, Frozen ground, Ground thawing, Detection, Classifications, Seasonal freeze thaw, Models, Russia—Siberia

51-1455
Late Carboniferous subaqueous glacial valley fill complex: fluctuations in meltwater output and sediment flux.
Visser, J.N.J., *South African journal of geology,* Sep. 1996, 99(3), p.285-291, With Afrikaans summary. 17 refs.
Pleistocene, Glacial geology, Geomorphology, Ice sheets, Ice rafting, Glacier beds, Glacial erosion, Glacial deposits, Meltwater, Sedimentation, Stratigraphy, Lithology, Outwash, South Africa—Nieuwoudtville

51-1456
Under the ice. *Geotimes,* July 1996, 41(7), p.7.
Glaciology, Glacial hydrology, Ice water interface, Water flow, Subsurface structures, Subglacial observations, Photographic techniques, Imaging

51-1457
Climatic meltdown. *Geotimes,* July 1996, 41(7), p.12.
Paleoclimatology, Oceanographic surveys, Marine deposits, Drill core analysis, Ice sheets, Glacier melting, Climatic changes, Global warming

51-1458
Studies supporting the development of spatially-distributed, physically-based snowmelt models for continental alpine areas.
Cline, D.W., Boulder, University of Colorado, 1995, 186p., University Microfilms order No.DA9613242, Ph.D. thesis. Refs. p.171-176.
Climatology, Alpine landscapes, Snow hydrology, Snowmelt, Snow depth, Mass balance, Surface energy, Snow air interface, Atmospheric boundary layer, Runoff forecasting, Simulation, Meteorological factors, Mathematical models

51-1459
Unidirectional freezing of cupric hydroxides sludge.
Hung, W.T., Lee, D.J., *Journal of environmental science and health,* Oct. 1996, A31(9), p.2129-2142, 21 refs.
Sewage treatment, Waste treatment, Sludges, Metals, Freezing front, Freeze thaw cycles, Freezing rate, Migration, Sedimentation, Particle size distribution

51-1460
Radiative transfer in cirrus clouds. Part IV: on cloud geometry, inhomogeneity, and absorption.
Liou, K.N., Rao, N., *Journal of the atmospheric sciences,* Nov. 1, 1996, 53(21), p.3046-3065, 38 refs.
Clouds (meteorology), Cloud physics, Radiation balance, Light scattering, Albedo, Ice crystal optics, Ice crystal size, Radiation absorption, Attenuation, Mathematical models, Sounding, Correlation

51-1461
Initial composition of jet condensation trails.
Kärcher, B., Peter, T., Biermann, U.M., Schumann, U., *Journal of the atmospheric sciences,* Nov. 1, 1996, 53(21), p.3066-3083, 57 refs.
Cloud physics, Condensation trails, Heterogeneous nucleation, Ice crystal growth, Ice crystal size, Distribution, Saturation, Aerosols, Ice nuclei, Carbon black, Simulation

51-1462
Finite-difference time domain method for light scattering by small ice crystals in three-dimensional space.
Yang, P., Liou, K.N., *Optical Society of America A. Journal,* Oct. 1996, 13(10), p.2072-2085, 40 refs.
Ice physics, Ice crystal optics, Light scattering, Refractivity, Ice dielectrics, Radiation absorption, Simulation, Cloud physics, Analysis (mathematics), Statistical analysis

51-1463
Disruption of the hydrogen-bonding network at the surface of I_h ice near surface premelting.
Dosch, H., Lied, A., Bilgram, J.H., *Surface science,* Oct. 10, 1996, 366(1), p.43-50, 22 refs.
Ice physics, Ice melting, Surface structure, Molecular structure, Hydrogen bonds, Defects, Water films, Ice water interface, Polarization (charge separation), X ray diffraction, Scattering, Reflectivity, Statistical analysis

51-1464
New 'Geological map of Greenland'.
Henriksen, N., *Denmark. Grønlands geologiske undersøgelse. Rapport,* 1995, No.165, p.10-12, 2 refs.
Geological maps, Subpolar regions, Tectonics, Marine geology, Ice cover thickness, Topographic maps, Greenland

51-1465
Geology and petroleum prospectivity of the region offshore southern West Greenland—a summary.
Chalmers, J.A., Dahl-Jensen, T., Bate, K.J., Whittaker, R.C., *Denmark. Grønlands geologiske undersøgelse. Rapport,* 1995, No.165, p.13-21, 37 refs.
Marine geology, Hydrocarbons, Geological surveys, Seismic surveys, Exploration, Boreholes, Tectonics, Earth crust, Stratigraphy, Petroleum industry, Natural resources, Greenland

51-1466
Fylla structural complex: possible very large gas reserves offshore southern West Greenland.
Bate, K.J., Whittaker, R.C., Chalmers, J.A., Dahl-Jensen, T., *Denmark. Grønlands geologiske undersøgelse. Rapport,* 1995, No.165, p.22-27, 10 refs.
Natural gas, Hydrocarbons, Reservoirs, Marine geology, Geological surveys, Seismic surveys, Tectonics, Structural analysis, Lithology, Stratigraphy, Porosity, Greenland

51-1467
Melville Bay area, north-West Greenland—the first phase of petroleum exploration.
Whittaker, R.C., Hamann, N.E., *Denmark. Grønlands geologiske undersøgelse. Rapport,* 1995, No.165, p.28-31, 7 refs.
Marine geology, Geological surveys, Exploration, Hydrocarbons, Reservoirs, Seismic surveys, Seismic reflection, Tectonics, Structural analysis, Greenland—Melville Bay

51-1468
Geophysical and petroleum geological activities in the Nuussuaq-Svartenhuk Halvø area 1994: promising results for an onshore exploration potential.
Christiansen, F.G., Marcussen, C., Chalmers, J.A., *Denmark. Grønlands geologiske undersøgelse. Rapport,* 1995, No.165, p.32-41, 16 refs.
Hydrocarbons, Exploration, Geological surveys, Reservoirs, Magma, Permeability, Seismic reflection, Stratigraphy, Greenland—Marratt

51-1469
Wandel Sea Basin; basin analysis—a summary.
Håkansson, E., Stemmerik, L., *Denmark. Grønlands geologiske undersøgelse. Rapport,* 1995, No.165, p.42-48, 21 refs.
Marine geology, Pleistocene, Quaternary deposits, Geological surveys, Stratigraphy, Earth crust, Sedimentation, Tectonics, Hydrocarbons, Exploration, Greenland—Wandel Sea

51-1470
Petroleum geology and thermal maturity of eastern North Greenland—a new energy research project.
Stemmerik, L., Dalhoff, F., Nilsson, I., *Denmark. Grønlands geologiske undersøgelse. Rapport,* 1995, No.165, p.49-52, 5 refs.
Hydrocarbons, Exploration, Geological surveys, Marine geology, Stratigraphy, Sedimentation, Reservoirs, Greenland

51-1471
Eastern North Greenland 1994, the 1:500 000 mapping project.
Henriksen, N., *Denmark. Grønlands geologiske undersøgelse. Rapport,* 1995, No.165, p.53-58, 14 refs.
Geological surveys, Geological maps, Geologic structures, Stratigraphy, Tectonics, Lithology, Research projects, Mapping, Greenland

51-1472
Project SUPRASYD 1994—Ketilidian supracrustal rocks in South-East Greenland and gold-bearing shear zones in the Julianehåb batholith.
Garde, A.A., Schønwandt, H.K., *Denmark. Grønlands geologiske undersøgelse. Rapport,* 1995, No.165, p.59-63, 13 refs.
Geological surveys, Exploration, Gold, Earth crust, Tectonics, Shear stress, Geological maps, Greenland

51-1473
New airborne electromagnetic and magnetic survey of Inglefield Land, North-West Greenland: Project AEM Greenland 1994-1998.
Stemp, R.W., Thorning, L., *Denmark. Grønlands geologiske undersøgelse. Rapport,* 1995, No.165, p.64-68, 8 refs.
Geological surveys, Aerial surveys, Exploration, Electromagnetic prospecting, Mapping, Geological maps, Topographic maps, Photogrammetry, Geomagnetism, Greenland

51-1474
Use of SPOT and Landsat TM satellite data in geological reconnaissance.
Tukiainen, T., Thorning, L., *Denmark. Grønlands geologiske undersøgelse. Rapport,* 1995, No.165, p.73-75, 3 refs.
Geological surveys, Remote sensing, LANDSAT, Spaceborne photography, Subpolar regions, Lithology, Exploration, Natural resources, Mapping, Image processing, Resolution, Greenland

51-1475
Landsat image database for Greenland.
Thorning, L., Tukiainen, T., *Denmark. Grønlands geologiske undersøgelse. Rapport,* 1995, No.165, p.76-78.
Geological surveys, Spaceborne photography, LANDSAT, Mapping, Geological maps, Image processing, Greenland

51-1476
Environmental impact on Greenland glaciers.
Olesen, O.B., Weidick, A., Reeh, N., Thomsen, H.H., Braithwaite, R.J., Bøggild, C.E., *Denmark. Grønlands geologiske undersøgelse. Rapport,* 1995, No.165, p.79-87, 27 refs.
Glacier surveys, Environmental impact, Climatic changes, Glacier oscillation, Sea level, Ice cores, Glacier mass balance, Isotope analysis, Ice models, Greenland

51-1477
International palaeo-environmental project at Paakitsoq, West Greenland.
Thomsen, H.H., et al, *Denmark. Grønlands geologiske undersøgelse. Rapport,* 1995, No.165, p.88-92, 23 refs.
Ice sheets, Climatology, Glacier surveys, Glacier flow, Velocity measurement, Ice cores, Dust, Sampling, Geochronology, Profiles, Greenland—Paakitsoq

51-1478

Newly detected ablation phenomenon in Dronning Maud Land, Antarctica.

Bøggild, C.E., Winther, J.G., *Denmark. Grønlands geologiske undersøgelse. Rapport,* 1995, No.165, p.93-96, 15 refs.

Ice sheets, Glacier surveys, Glacial hydrology, Glacier ablation, Meltwater, Subglacial observations, Colored ice, Subsurface drainage, Albedo, Sea level, Antarctica—Queen Maud Land

Of the two ice sheets in the world, Greenland and Antarctica, only the Greenland ice sheet displays significant surface melting, since the climate in Antarctica is generally too cold for large scale melting. However, different types of melt phenomena have been observed in blue ice fields in Antarctica. The Geological Survey of Greenland was invited to participate in the Norwegian Antarctic Research Expedition 1993-94 in order to study physical melt processes in Queen Maud Land in an environment which is similar to near equilibrium areas in the high arctic regions of the Greenland ice sheet. Perhaps the first recorded subsurface melt phenomenon within clear blue ice was discovered during the 1993-94 expedition; numerical modelling shows this to be a consequence of solar radiation penetration and absorption, i.e. the 'solid-state greenhouse effect'. This discovery may contribute to the understanding of runoff from high polar regions of both the antarctic and Greenland ice sheets. (Auth. mod.)

51-1479

Ocean-atmosphere-ice interactions: roles of high-latitude oceans in the global climate system.

Takeuchi, K., *Seppyo,* Sep. 1996, 58(5), p.389-392, In Japanese. 3 refs.

Air ice water interaction, Polar atmospheres, Marine atmospheres, Atmospheric circulation, Ocean currents, Global change

51-1480

Chemical composition of snow cover and rime at Mt. Zao, Yamagata Prefecture, Japan.

Yanagisawa, F., Nakagawa, N., Abe, H., Yano, K., *Seppyo,* Sep. 1996, 58(5), p.393-403, In Japanese with English summary. 12 refs.

Atmospheric composition, Atmospheric circulation, Air pollution, Scavenging, Snow air interface, Snow composition, Snow impurities, Ice air interface, Glaze, Ice composition, Japan

51-1481

Characteristics of ice/water mixture flow in a branching pipe and development of an ice fraction control technique.

Kawada, Y., Shirakashi, M., Takizawa, S., *Seppyo,* Sep. 1996, 58(5), p.405-415, In Japanese with English summary and figure captions. 7 refs.

Ice thermal properties, Ice refrigeration, Ice heat loss, Ice water interface, Cooling systems, Pipe flow, Flow control

51-1482

Concentrations of chemical constituents in snow and rime at Mt. Tanigawa.

Fukuzaki, N., Mori, K., *Seppyo,* Sep. 1996, 58(5), p.417-421, In Japanese with English summary. 13 refs.

Atmospheric composition, Air pollution, Scavenging, Snow composition, Snow impurities, Glaze, Ice composition, Ion density (concentration), Japan

51-1483

Recent molecular dynamics simulation studies: structural phase transition of ice.

Hashimoto, T., Sugawara, S., Hiwatari, Y., *Seppyo,* Sep. 1996, 58(5), p.422-424, In Japanese. 7 refs.

High pressure ice, Ice crystal structure, Ice microstructure, Ice spectroscopy, Molecular structure, Molecular energy levels, Hydrogen bonds, Phase transformations, Solid phases

51-1484

Recent studies on gas hydrates—activities of gas hydrate studies in Japan.

Uchida, T., *Seppyo,* Sep. 1996, 58(5), p.425-427, In Japanese. 7 refs.

Ice composition, Ice crystal structure, Gas inclusions, Hydrates

51-1485

More words on snow countermeasures for National Highway 17 (Part 3). [Kokudo 17-go yuki taisaku yowa (sono 3)]

Abe, T., *Seppyo,* Sep. 1996, 58(5), p.443-448, In Japanese. 3 refs.

Avalanche engineering, Snowsheds, Snow fences, Road maintenance, Japan

51-1486

Precipitation in the southern Great Plains: observations and model simulations of present-day and doubled atmospheric CO_2 concentrations.

Legates, D.R., DeLiberty, T.L., Global Climate Change Response Program, Denver, CO, U.S. Bureau of Reclamation, May 1996, 80p. + append., PB96-181367, 22 refs.

Precipitation (meteorology), Atmospheric circulation, Atmospheric composition, Air pollution, Carbon dioxide, Global warming, Computerized simulation, United States—Kansas, United States—Oklahoma

51-1487

High latitude climate and remote sensing.

Kondrat'ev, K.IA., Johannessen, O.M., Melent'ev, V.V., Wiley-Praxis series in remote sensing, Chichester, England, John Wiley & Sons Ltd., 1996, 200p., Refs. p.168-194.

DLC QC994.75.K67 1996

Polar atmospheres, Marine atmospheres, Atmospheric circulation, Atmospheric composition, Cloud cover, Aerosols, Air ice water interaction, Ice cover effect, Snow cover effect, Radiation balance, Global warming, Radiometry, Spaceborne photography

This book discusses the monitoring of global warming by passive and active satellite remote sensing of the atmosphere, ocean, ice, and snow at high latitudes in the microwave range. The emphasis is on global, Northern Hemisphere, or arctic processes, but numerous comparisons with the Antarctic are cited, with particular interest in the antarctic ozone hole, aerosols, and heat balance. The pertinence to the Antarctic is also frequently implied where not explicit.

51-1488

Report of the International Ice Patrol in the North Atlantic, 1995 season.

U.S. Coast Guard, *U.S. Coast Guard. Bulletin,* 1995, No.81, 77p., Refs. passim.

Ice reporting, Ice surveys, Sea ice distribution, Ice conditions, Ice edge, Icebergs, Drift

51-1489

Snowplow with deicer spray attachment.

Weeks, W.D., *U.S. Patent Office. Patent,* May 14, 1996, n.p., USP-5,515,623, 14 refs.

Road icing, Chemical ice prevention, Snow removal equipment, Road maintenance

51-1490

Deicer.

Johnston, D.P., *U.S. Patent Office. Patent,* Dec. 27, 1994, n.p., USP-5,376,293, 7 refs.

Road icing, Chemical ice prevention, Salting, Road maintenance

51-1491

Windshield de-icing and defrosting mitt using microwave energy heating and method.

Gibbon, R.M., *U.S. Patent Office. Patent,* Nov. 29, 1994, n.p., USP-5,369,257, 9 refs.

Motor vehicles, Windows, Artificial melting, Ice removal, Defrosting, Heating

51-1492

Pavement deicer compositions.

Hubred, G.L., Todd, H.E., *U.S. Patent Office. Patent,* Sep. 27, 1994, n.p., USP-5,350,533, 9 refs.

Road icing, Chemical ice prevention, Ice removal, Road maintenance

51-1493

Multiple purpose tire chains.

Labonville, R.P., *U.S. Patent Office. Patent,* June 13, 1995, n.p., USP-5,423,365, 18 refs.

Tires, Vehicle wheels, Skid resistance, Traction

51-1494

Ground thaw apparatus.

Ohmann, B., *U.S. Patent Office. Patent,* Aug. 15, 1995, n.p., USP-5,441,038, 21 refs.

Ground thawing, Artificial thawing, Defrosting, Heat sources, Portable equipment

51-1495

System for deicing dish mounted antennae.

Jones, T.M., *U.S. Patent Office. Patent,* Oct. 4, 1994, n.p., USP-5,353,037, 3 refs.

Antennas, Artificial melting, Ice removal, Defrosting, Infrared equipment, Heating

51-1496

System for de-icing airplanes.

Anderson, T.M., *U.S. Patent Office. Patent,* Oct. 11, 1994, n.p., USP-5,354,014, 12 refs.

Aircraft icing, Chemical ice prevention, Ice removal

51-1497

Deicer/anti-icer compositions for aircraft.

Chan, S.K., Hubred, G.L., Todd, H.E., *U.S. Patent Office. Patent,* July 25, 1995, n.p., USP-5,435,930, 10 refs.

Aircraft icing, Chemical ice prevention, Ice removal

51-1498

Method of, and apparatus for, de-icing an aircraft by infrared radiation.

Chew, C.J., Seel, T.P., *U.S. Patent Office. Patent,* May 23, 1995, n.p., USP-5,417,389, 7 refs.

Aircraft icing, Artificial melting, Ice removal, Defrosting, Infrared equipment, Heating

51-1499

Aircraft wing de-icers with improved holdover times.

Coffey, D.A., Ashrawi, S.S., Nieh, E.C., *U.S. Patent Office. Patent,* Feb. 7, 1995, n.p., USP-5,386,968, 11 refs.

Aircraft icing, Chemical ice prevention, Ice removal

51-1500

Method of and apparatus for detection of ice accretion.

Hansman, R.J., Jr., Dershowitz, A.L., *U.S. Patent Office. Patent,* May 17, 1994, n.p., USP-5,313,202, 21 refs.

Aircraft icing, Ice accretion, Ice detection

51-1501

Side flex leading edge ice protector.

Leffel, K.L., Rauckhorst, R.L., III, *U.S. Patent Office. Patent,* Feb. 6, 1996, n.p., USP-5,489,073, 5 refs.

Aircraft icing, Ice removal

51-1502

System for detecting ice or snow on surface which specularly reflects light.

Stern, H., *U.S. Patent Office. Patent,* July 2, 1996, n.p., USP-5,532,738, 5 refs.

Aircraft icing, Ice detection, Ice dielectrics, Ice optics, Polarization (waves), Specular reflection

51-1503

Snowshoe with adjustable decking tension.

Vincent, M., *U.S. Patent Office. Patent,* Aug. 6, 1996, n.p., USP-5,542,197, 23 refs.

Snow cover effect, Snow surface, Clothing, Human factors engineering

51-1504

Combination snowshoe and binding.

McKenzie, M.M., Edwards, S., *U.S. Patent Office. Patent,* Feb. 27, 1996, n.p., USP-5,493,794, 17 refs.

Snow cover effect, Snow surface, Clothing, Human factors engineering

51-1505

Cryogenic method and system for remediating contaminated earth.

Dash, J.G., *U.S. Patent Office. Patent,* Sep. 3, 1996, n.p., USP-5,551,799, 14 refs.

Soil pollution, Soil freezing, Artificial freezing, Land reclamation, Waste disposal

51-1506

Ozone saga, the GOME experiment and the Nobel story...

Hahne, A., *Earth observation quarterly,* Mar. 1996, No.51, p.1-5, 10 refs.

Ozone, Meteorological instruments, Atmospheric composition, Air pollution, Ultraviolet radiation, Spaceborne photography, Stratosphere, Global change, Remote sensing, Antarctica

The first results provided by the GOME (Global Ozone Monitoring Experiment) aboard ESA's remote-sensing satellite ERS-2 including the ozone content over Antarctica, are discussed. The atmosphere surrounding the Earth contains small quantities of ozone, a gas with molecules consisting of three oxygen atoms (O3). If all the ozone of the atmosphere were compressed to a pressure corresponding to that at the Earth's surface, the layer would be only 3 mm thick. But even though ozone occurs in such small quantities, it plays an exceptionally fundamental part in life on Earth. This is because ozone, together with ordinary molecular oxygen, is able to absorb the major part of the Sun's UV radiation and therefore prevents this dangerous radiation from reaching the surface. Without a protective ozone layer in the atmosphere, animals and plants could not exist, at least on land. (Auth. mod.)

51-1507

ERS-1 SAR backscatter from nilas and young ice during freeze-up.

Ulander, L.M.H., Carlström, A., Askne, J., *EARSeL advances in remote sensing,* Dec. 1994, 3(2), p.1-8, 18 refs.

Ice surveys, Sea ice distribution, Radiometry, Ice detection, Freezeup, Synthetic aperture radar, Spaceborne photography, Backscattering, Image processing, Young ice, Surface roughness, Classifications, Temperature effects, Snow cover effect

51-1508

Modelling radar sea ice backscatter in support of the ERS-1 SAR.

Partington, K.C., Hanna, M., *EARSeL advances in remote sensing,* Dec. 1994, 3(2), p.9-23, 30 refs.

Sea ice distribution, Ice surveys, Young ice, Classifications, Spacecraft, Synthetic aperture radar, Radar echoes, Backscattering, Surface roughness, Snow cover effect, Seasonal variations, Ice dielectrics, Mathematical models

51-1509

Radar backscatter estimates from a combined ice growth and surface scattering model of first year sea ice.

Wade, R.H., Weeks, W.F., *EARSeL advances in remote sensing,* Dec. 1994, 3(2), p.24-30, 16 refs.

Sea ice distribution, Ice surveys, Spaceborne photography, Synthetic aperture radar, Backscattering, Young ice, Ice growth, Brines, Ice detection, Mathematical models, Ice dielectrics, Temperature effects

51-1510

Interpretation of radar signatures observed in SAR images of ice island T-3 by means of backscatter modelling.

Dierking, W., Garrity, C., Ramseier, R.O., *EARSeL advances in remote sensing,* Dec. 1994, 3(2), p.31-43, 22 refs.

Sea ice, Ice surveys, Ice islands, Ice shelves, Lake ice, Spaceborne photography, Synthetic aperture radar, Backscattering, Surface roughness, Firn, Ice lenses, Topographic effects, Image processing, Classifications

51-1511

Accuracy of ice concentration derived from ERS-1 SAR images during the late melt period in the Arctic.

Askne, J., Ulander, L.M.H., Birkeland, D., *EARSeL advances in remote sensing,* Dec. 1994, 3(2), p.44-49, 9 refs.

Sea ice distribution, Ice surveys, Synthetic aperture radar, Spaceborne photography, Ice melting, Ponds, Classifications, Backscattering, Resolution, Image processing, Accuracy

51-1512

Sizex '92 ERS-1 SAR ice validation experiment.

Sandven, S., Johannessen, O.M., Kloster, K., Milnes, M., *EARSeL advances in remote sensing,* Dec. 1994, 3(2), p.50-56, 15 refs. For another version see 48-3464.

Sea ice distribution, Ice surveys, Spaceborne photography, Synthetic aperture radar, Image processing, Surface structure, Ice edge, Ice detection, Classifications

51-1513

New correlation technique for ice-motion analysis.

Sun, Y., *EARSeL advances in remote sensing,* Dec. 1994, 3(2), p.57-63, 13 refs.

Sea ice distribution, Ice surveys, Pack ice, Drift, Orientation, Ice detection, Spaceborne photography, Synthetic aperture radar, Image processing, Spectra, Correlation, Mathematical models

51-1514

ERS-1 SAR over open water in the Baltic Sea.

Herlevi, A., Leppäranta, M., *EARSeL advances in remote sensing,* Dec. 1994, 3(2), p.64-70, 11 refs.

Oceanographic surveys, Ice surveys, Spaceborne photography, Synthetic aperture radar, Sea ice distribution, Ice edge, Ice detection, Ocean waves, Ocean currents, Photointerpretation, Baltic Sea

51-1515

Microwave signatures of sea ice from ARKTIS 93 experiment.

Flückiger, K., Gmünder, H., Mätzler, C., *EARSeL advances in remote sensing,* Dec. 1994, 3(2), p.71-80, 1 ref.

Oceanographic surveys, Sea ice distribution, Ice surveys, Ice floes, Topographic features, Radiometry, Microwaves, Brightness, Snow cover effect, Statistical analysis, Temperature effects

51-1516

Merging microwave radiometer data and meteorological data for improved sea ice concentrations.

Pedersen, L.T., *EARSeL advances in remote sensing,* Dec. 1994, 3(2), p.81-89, 14 refs.

Sea ice distribution, Ice surveys, Radiometry, Climatology, Thermal radiation, Meteorological data, Mathematical models, Accuracy, Statistical analysis, Correlation

51-1517

Wind events compared with polynya area estimates derived from SSM/I data.

Markus, T., Burns, B.A., *EARSeL advances in remote sensing,* Dec. 1994, 3(2), p.90-99, 19 refs. For another source see 50-5596 or F-55286.

Sea ice distribution, Ice surveys, Ice detection, Polynyas, Ice edge, Radiometry, Brightness, Wind factors, Statistical analysis, Mathematical models, Image processing, Air ice water interaction

Different methods for estimating ice concentration as well as special polynya detection algorithms are applied to passive microwave data to determine the size of small coastal polynyi, in the Weddell Sea region of the Antarctic for Sep. 1989. The detection algorithms use 1- and 2-dimensional polynya signature models based on generation of synthetic microwave images of polynya events, which are compared with measured microwave data of the 37 GHz vertical polarization channel. The results from all methods are compared with wind data and with calculations from a dynamic model of polynya size in a case study for a region close to Halley Bay. (Auth. mod.)

51-1518

Arctic sea ice during the winter to summer transition as seen by the AMI-Wind and ATSR/M of ERS-1.

Ezraty, R., Gohin, F., Cavanié, A., *EARSeL advances in remote sensing,* Dec. 1994, 3(2), p.100-111, 12 refs.

Sea ice distribution, Ice surveys, Ice detection, Spaceborne photography, Radiometry, Synthetic aperture radar, Sensor mapping, Ice edge, Scattering, Accuracy, Correlation, Brightness, Seasonal variations

51-1519

Sea ice extent mapping using the ERS-1 radar altimeter.

Laxon, S., *EARSeL advances in remote sensing,* Dec. 1994, 3(2), p.112-116, 17 refs.

Sea ice distribution, Ice surveys, Radar echoes, Height finding, Spacecraft, Sensor mapping, Ice detection, Resolution, Radiometry, Correlation

51-1520

On the recent enrichment of subcontinental lithosphere: a detailed U-Pb study of spinel lherzolite xenoliths, Yukon, Canada.

Carignan, J., Ludden, J., Francis, D., *Geochimica et cosmochimica acta,* Nov. 1996, 60(21), p.4241-4252, 46 refs.

Pleistocene, Geological surveys, Tectonics, Quaternary deposits, Sampling, Lithology, Magma, Geologic processes, Geochemistry, Isotope analysis, Canada—Yukon Territory—Alligator Lake

51-1521

Frozen clouds accelerate ozone destruction.

Pearce, F., *New scientist,* Oct. 12, 1996, 152(2051), p.6.

Polar atmospheres, Stratosphere, Climatic changes, Ozone, Atmospheric density, Air temperature, Degradation

Ozone concentrations over Antarctica were plunging towards record lows the week of Oct. 12, 1996 as the ozone hole spread across the continent. At the British Halley base, readings fell to 109 Dobson Units, compared to a pre-hole average of 300 DU. "This is close to the record low of 101 DU in 1994," says the British Antarctic Survey's chief data collector, Jon Shanklin. (Auth. mod.)

51-1522

Absolute dating of late Quaternary lacustrine sediments by high resolution varve chronology.

Zolitschka, B., *Hydrobiologia,* 1991, Vol.214, International Symposium on Palaeolimnology, 5th, Cumbria, UK, Aug. 31-Sep. 6, 1989. Proceedings. Environmental history and palaeolimnology, p.59-61, 11 refs.

DLC QE39.5.P3 I58

Limnology, Lacustrine deposits, Quaternary deposits, Geochronology, Accuracy, Drill core analysis, Paleoecology, Palynology, Stratigraphy

51-1523

Modern assemblages of arctic and alpine Chironomidae as analogues for late-glacial communities.

Walker, I.R., *Hydrobiologia,* 1991, Vol.214, International Symposium on Palaeolimnology, 5th, Cumbria, UK, Aug. 31-Sep. 6, 1989. Proceedings. Environmental history and palaeolimnology, p.223-227, 14 refs.

DLC QE59.5.P3 I58

Paleoecology, Limnology, Lacustrine deposits, Biogeography, Statistical analysis, Simulation

51-1524

Paleolimnology of a polar oasis, Truelove Lowland, Devon Island, N.W.T., Canada.

King, R.H., *Hydrobiologia,* 1991, Vol.214, International Symposium on Palaeolimnology, 5th, Cumbria, UK, Aug. 31-Sep. 6, 1989. Proceedings. Environmental history and palaeolimnology, p.317-325, 24 refs.

DLC QE59.5.I58

Limnology, Paleoecology, Lacustrine deposits, Quaternary deposits, Stratigraphy, Isostasy, Arctic landscapes, Geochronology, Correlation, Canada—Northwest Territories—Devon Island

51-1525

Nature of thin crust across the southwest Greenland margin and its bearing on the location of the ocean-continent boundary.

Srivastava, S.P., Roest, W.R., NATO Advanced Research Workshop on Rifted Ocean-Continent Boundaries, Mallorca, Spain, 11-14 May, 1994. Proceedings and NATO Advanced Science Institutes, Series C. Mathematical and Physical Sciences. Vol.463, Dordrecht, Kluwer Academic Publishers, 1995, p.95-120, 40 refs.

DLC QE511.4.R54

Marine geology, Ocean bottom, Tectonics, Earth crust, Seismic surveys, Seismic refraction, Seismic reflection, Profiles, Magnetic surveys, Magnetic anomalies, Correlation, Greenland

51-1526

Anisotropy measurements and the deep structure of a passive margin: southwestern Greenland.
Carbonell, R., Speece, M.A., Clement, W.P., Smithson, S.B., NATO Advanced Research Workshop on Rifted Ocean-Continent Boundaries, Mallorca, Spain, 11-14 May, 1994. Proceedings and NATO Advanced Science Institutes, Series C. Mathematical and Physical Sciences. Vol.463, Dordrecht, Kluwer Academic Publishers, 1995, p.121-146, Refs. p.143-146.
DLC QE511.4.R54
Geological surveys, Tectonics, Marine geology, Seismic surveys, Seismic velocity, Anisotropy, Earth crust, Classifications, Rock properties, Statistical analysis, Accuracy, Wave propagation, Greenland

51-1527

Evidence for hydraulically controlled outflow of brackish water from Holandsfjord, Norway.
Stigebrandt, A., Molvær, J., *Journal of physical oceanography,* Feb. 1996, 26(2), p.257-266, 22 refs.
Oceanography, Subpolar regions, Estuaries, Runoff, Water level, Ocean currents, Hydraulics, Stratification, Salinity, Profiles, Statistical analysis, Norway—Holandsfjord

51-1528

Response of *Bacillus subtilis* spores to dehydration and UV irradiation at extremely low temperatures.
Dose, K., Klein, A., *Origins of life and evolution,* Feb. 1996, 26(1), p.47-59, 19 refs.
Bacteria, Microbiology, Cryobiology, Desiccation, Ultraviolet radiation, Degradation, Preserving, Photochemical reactions, Environmental tests, Low temperature tests, Survival, Simulation, Planetary environments

51-1529

Frost-induced deformations and stresses in pipelines.
Razaqpur, A.G., Wang, D.Y., *International journal of pressure vessels and piping,* Dec. 1995, 69(2), p.105-118, 29 refs.
Gas pipelines, Underground pipelines, Tensile properties, Frozen ground expansion, Frost action, Frost heave, Deformation, Soil creep, Stress concentration, Soil pressure, Profiles, Mathematical models

51-1530

Strategies for restoring spring flooding to a drying northern delta.
Prowse, T.D., Aitken, B., Demuth, M.N., Peterson, M., *Regulated rivers: research & management,* Mar.-June 1996, 12(2-3), p.237-250, 27 refs.
Deltas, Hydrology, River flow, Ecosystems, Ice jams, Artificial ice, Ice accretion, Spray freezing, Water level, Flooding, Flow control, Environmental tests, Canada—Alberta—Peace River

51-1531

Observations of the glaciers in the southern maritime Alps (Italy).
Gellatly, A.F., Grove, J.M., Latham, R., Parkinson, R.J., *Revue de géomorphologie dynamique,* 1994, 43(3), p.93-107, With French summary. 27 refs.
Alpine glaciation, Mountain glaciers, Glacier surveys, Glacier oscillation, Topographic surveys, Topographic effects, Classifications, Lichens, Age determination, Italy—Alps

51-1532

Glacial cover in the Campo de Hielos Sur (southern Chile). [La calota glacial en el Campo de Hielos Sur (Chile Austral)]
Börgel, R., *Revista de geografia Norte Grande,* 1994, No.21, p.37-42, In Spanish with French summary. 4 refs.
Glacier surveys, Glaciation, Geomorphology, Glacial geology, Hydrologic cycle, Chile—Patagonia

51-1533

Submarine LNG tankers to carry Russia's ice-bound Kara Sea gas to Asia.
George, D., *Offshore,* Nov. 1996, 56(11), p.32,82.
Natural gas, Tanker ships, Submarines, Marine transportation, Subglacial navigation, Construction, Arctic Ocean, Russia—Kara Sea

51-1534

Cryogenic temperature measurement.

Rusby, R.L., Kempson, M., *Revu générale de thermique,* May 1996, 35(413), p.338-343, 12 refs.

Low temperature research, Cryogenics, Temperature measurement, Laboratory techniques, Sensors, Semiconductors (materials), Thermocouples, Design criteria

51-1535

Palynological data on a Holocene peat deposit in tropical Brasil: preliminary paleoclimatic and paleoecological interpretations.

Modenesi, M.C., Melhem, T.S., *Revista do Instituto Geológico,* 1992, 13(2), p.7-15, With Spanish summary. 26 refs.

Paleoclimatology, Paleoecology, Classifications, Palynology, Quaternary deposits, Peat, Geomorphology, Vegetation patterns, Landscape development, Stratigraphy, Radioactive age determination, Geochronology, Brazil—Campos do Jordão Plateau

51-1536

Quaternary paleoecology of Fuego-Patagonia.

Heusser, C.J., *Revista do Instituto Geológico,* 1994, 15(2), p.7-26, 50 refs.

Paleoecology, Paleoclimatology, Pleistocene, Subpolar regions, Quaternary deposits, Peat, Tundra vegetation, Revegetation, Vegetation patterns, Geochronology, Stratigraphy, Radioactive age determination, Climatic factors, Argentina—Patagonia, Chile—Patagonia

51-1537

Forcing of Atlantic equatorial and subpolar millennial cycles by precession.

McIntyre, A., Molfino, B., *Science,* Dec. 13, 1996, 274(5294), p.1867-1870, 33 refs.

Sea ice, Ice melting, Algae, Atlantic Ocean

51-1538

Recovery of antarctic ozone hole.

Hofmann, D.J., *Nature,* Nov. 21, 1996, 384(6606), p.222-223, 8 refs.

Ozone, Atmospheric composition, Chemical composition, Measuring instruments, Antarctica—Amundsen-Scott Station, Antarctica—Halley Station

An assessment is made of the recovery of ozone over Antarctica from Jan. 1996 to Nov. 1996, along with a projection of the trend into the mid-21st century. It is expected that detection of a healing of ozone depletion should occur early in the next century. A brief review is given of the ozone measuring program which resulted from the ban of CFCs and halogens as required by the Montreal Protocol. At the present rate and barring future non-compliance with the M/P, the total ozone destroying potential in the atmosphere will peak in the stratosphere between 1997 and 1999, the ozone layer will begin to heal slowly, and will reach pre-ozone-hole levels by about 2050.

51-1539

Structural basis for the binding of a globular antifreeze protein to ice.

Jia, Z., DeLuca, C.I., Chao, H., Davies, P.L., *Nature,* Nov. 21, 1996, 384(6606), p.285-288, 26 refs.

Ice growth, Ice crystal structure, Antifreezes

51-1540

Effect of small-scale inhomogeneities on ozone depletion in the Arctic.

Edouard, S., Legras, B., Lefèvre, F., Eymard, R., *Nature,* Dec. 5, 1996, 384(6608), p.444-447, 22 refs.

Ozone, Stratosphere, Atmospheric composition, Chemical composition, Models

51-1541

Possible role of dust-induced regional warming in abrupt climate change during the last glacial period.

Overpeck, J., Rind, D., Lacis, A., Healy, R., *Nature,* Dec. 5, 1996, 384(6608), p.447-449, 36 refs.

Dust, Climatic changes, Paleoclimatology

51-1542

Filling and plugging of a marine basin by volcanic rocks: the Tunoqqu Member of the Lower Tertiary Vaigat Formation on Nuussuaq, central West Greenland.

Pedersen, A.K., Larsen, L.M., Pedersen, G.K., Dueholm, K.S., *Denmark. Grønlands geologiske undersøgelse. Bulletin,* 1996, No.171, p.5-28, 32 refs.

Pleistocene, Geological surveys, Subpolar regions, Geomorphology, Tectonics, Magma, Sedimentation, Volcanoes, Reservoirs, Photogrammetric surveys, Stratigraphy, Lithology, Greenland—Nuussuaq

51-1543

Early Tertiary lavas and sills on Traill Ø and Geographical Society Ø, northern East Greenland: petrography and geochemistry.

Hald, N., *Denmark. Grønlands geologiske undersøgelse. Bulletin,* 1996, No.171, p.29-43, 43 refs.

Geological surveys, Subpolar regions, Tectonics, Pleistocene, Sedimentation, Magma, Lithology, Geochemistry, Sampling, Greenland

51-1544

Stratigraphy and depositional evolution of the Upper Palaeozoic sedimentary succession in eastern Peary Land, North Greenland.

Stemmerik, L., et al, *Denmark. Grønlands geologiske undersøgelse. Bulletin,* 1996, No.171, p.45-71, 40 refs.

Geological surveys, Subpolar regions, Pleistocene, Tectonics, Marine geology, Sedimentation, Paleoecology, Stratigraphy, Lithology, Geochronology, Greenland—Peary Land

51-1545

Upper Permian foraminifera from East Greenland.

Pattison, J., Stemmerik, L., *Denmark. Grønlands geologiske undersøgelse. Bulletin,* 1996, No.171, p.73-90, 33 refs.

Geological surveys, Subpolar regions, Pleistocene, Paleoecology, Marine deposits, Sedimentation, Classifications, Stratigraphy, Drill core analysis, Thin sections, Correlation, Greenland

51-1546

Continued geophysical and petroleum geological activities in West Greenland in 1995 and the start of onshore exploration.

Christiansen, F.G., Bate, K.J., Dam, G., Marcussen, C., Pulvertaft, T.C.R., *Denmark. Grønlands geologiske undersøgelse. Bulletin,* 1996, No.172, p.15-21, 22 refs.

Geological surveys, Hydrocarbons, Marine geology, Exploration, Subpolar regions, Sedimentation, Reservoirs, Seismic surveys, Greenland

51-1547

Drilling of stratigraphic borehole Umiivik-1, Svartenhuk Halvø, West Greenland.

Bate, K.J., Christiansen, F.G., *Denmark. Grønlands geologiske undersøgelse. Bulletin,* 1996, No.172, p.22-27, 13 refs.

Geological surveys, Marine geology, Quaternary deposits, Marine deposits, Hydrocarbons, Subpolar regions, Exploration, Boreholes, Stratigraphy, Drill core analysis, Geochemistry, Greenland

51-1548

Preliminary seismic interpretation of an area with extensive Tertiary basalts offshore central West Greenland.

Whittaker, R.C., *Denmark. Grønlands geologiske undersøgelse. Bulletin,* 1996, No.172, p.28-31, 9 refs.

Geological surveys, Marine geology, Tectonics, Sediments, Subpolar regions, Marine deposits, Seismic surveys, Hydrocarbons, Exploration, Greenland

51-1549

Resources of the sedimentary basins of North and East Greenland—an integrated petroleum and ore geological research project.

Stemmerik, L., et al, *Denmark. Grønlands geologiske undersøgelse. Bulletin,* 1996, No.172, p.32-36, 5 refs.

Geological surveys, Hydrocarbons, Minerals, Diagenesis, Exploration, Research projects, Subpolar regions, Geochemistry, Lithology, Greenland

51-1550

Cretaceous-Tertiary pre-drift sediments of the Kangerlussuaq area, southern East Greenland.

Larsen, M., Hamberg, L., Olaussen, S., Stemmerik, L., *Denmark. Grønlands geologiske undersøgelse. Bulletin,* 1996, No.172, p.37-41, 13 refs.

Geological surveys, Subpolar regions, Tectonics, Sedimentation, Reservoirs, Stratigraphy, Lithology, Greenland

51-1551

Conclusion of the 1:500 000 field mapping in eastern North Greenland.

Henriksen, N., *Denmark. Grønlands geologiske undersøgelse. Bulletin,* 1996, No.172, p.42-48, 13 refs.

Geological surveys, Geological maps, Subpolar regions, Tectonics, Sedimentation, Stratigraphy, Lithology, Quaternary deposits, Greenland

51-1552

Lower Palaeozoic carbonates in eastern North Greenland, and the demise of the 'Sæfaxi Elv nappe'.

Rasmussen, J.A., Smith, M.P., *Denmark. Grønlands geologiske undersøgelse. Bulletin,* 1996, No.172, p.49-54, 17 refs.

Geological surveys, Subpolar regions, Marine geology, Tectonics, Sedimentation, Sampling, Stratigraphy, Lithology, Greenland

51-1553

Distribution of gold, arsenic, and antimony in West and South Greenland: a guide to mineral exploration and environmental management.

Steenfelt, A., *Denmark. Grønlands geologiske undersøgelse. Bulletin,* 1996, No.172, p.55-61, 25 refs.

Geological surveys, Subpolar regions, Earth crust, Minerals, Gold, Distribution, Exploration, Sedimentation, Sampling, Neutron activation analysis, Greenland

51-1554

Inglefield Land 1995: geological and economic reconnaissance in North-West Greenland.

Thomassen, B., Dawes, P.R., *Denmark. Grønlands geologiske undersøgelse. Bulletin,* 1996, No.172, p.62-68, 22 refs.

Geological surveys, Subpolar regions, Tectonics, Sedimentation, Geologic structures, Bedrock, Lithology, Magnetic anomalies, Geochemistry, Minerals, Greenland—Inglefield Land

51-1555

Puzzle of the circular features in Inglefield Land, North-West Greenland.

Appel, P.W.U., *Denmark. Grønlands geologiske undersøgelse. Bulletin,* 1996, No.172, p.69-70, 8 refs.

Geological surveys, Subpolar regions, Geologic structures, Photogeology, Patterned ground, Glacial geology, Glacial deposits, Sedimentation, Greenland—Inglefield Land

51-1556

Airborne geophysical surveys in 1995.

Thorning, L., Stemp, R.W., *Denmark. Grønlands geologiske undersøgelse. Bulletin,* 1996, No.172, p.71-73, 4 refs.

Geological surveys, Geophysical surveys, Aerial surveys, Subpolar regions, Magnetic surveys, Mapping

51-1557

Use of gas analyses in modelling mineralising events in the Jameson Land Basin, East Greenland.

Pedersen, M., *Denmark. Grønlands geologiske undersøgelse. Bulletin,* 1996, No.172, p.74-77, 7 refs.

Geological surveys, Subpolar regions, Reservoirs, Tectonics, Minerals, Metals, Sampling, Exploration, Isotope analysis, Gas inclusions, Greenland—Jameson Land Basin

51-1558

Glacier and climate research on Hans Tausen Iskappe, North Greenland—1995 glacier basin activities and preliminary results.

Thomsen, H.H., Reeh, N., Olesen, O.B., Jonsson, P., *Denmark. Grønlands geologiske undersøgelse. Bulletin,* 1996, No.172, p.78-84, 11 refs.

Glacier surveys, Subpolar regions, Climatology, Ice cores, Ice temperature, Drill core analysis, Glacier mass balance, Glacier flow, Velocity measurement, Sampling, Isotope analysis, Greenland—Hans Tausen Iskapppe

51-1559

Danish Lithosphere Centre in 1995.

Larsen, H.C., *Denmark. Grønlands geologiske undersøgelse. Bulletin,* 1996, No.172, p.85-87, 11 refs.

Research projects, Geological surveys, Tectonics, Magma, Stratigraphy, Continental drift, Subpolar regions, International cooperation, Greenland

51-1560

Palaeoproterozoic Nagssugtoqidian orogen in West Greenland: current status of work by the Danish Lithosphere Centre.

van Gool, J., Marker, M., Mengel, F., *Denmark. Grønlands geologiske undersøgelse. Bulletin,* 1996, No.172, p.88-94, 10 refs.

Geological surveys, Subpolar regions, Research projects, Tectonics, Lithology, Geologic structures, Greenland—Nagssugtoqidian

51-1561

East Greenland volcanic rifted margin—onshore DLC fieldwork.

Brooks, C.K., *Denmark. Grønlands geologiske undersøgelse. Bulletin,* 1996, No.172, p.95-102, 27 refs.

Geological surveys, Subpolar regions, Tectonics, Volcanoes, Magma, Earth crust, Sampling, Lithology, Geologic structures, Greenland

51-1562

ODP Leg 163, South-East Greenland volcanic rifted margin.

Larsen, H.C., Duncan, R.S., Allan, J.F., *Denmark. Grønlands geologiske undersøgelse. Bulletin,* 1996, No.172, p.103-112, 32 refs.

Geological surveys, Subpolar regions, Offshore drilling, Drill core analysis, Tectonics, Marine geology, Magma, Volcanoes, Seismic surveys, Magnetic anomalies, Greenland

51-1563

Runway crack repair research project (Silver Bay Municipal Airport).

Huston, P.R., Nybakken, D.J., Minnesota. Department of Transportation. Report MN/PR 96-20, St. Paul, Apr. 1996, 10p. + appends.

Airports, Runways, Winter maintenance, Bituminous concretes, Pavement bases, Sealing, Compaction, Cold weather performance, Crack propagation, Frost heave, Frost action, Countermeasures

51-1564

Proceedings.

Conference on Hail Damage Mitigation and Hail Science, Bismarck, ND, Mar. 19-20, 1996, Bismarck, North Dakota Atmospheric Resource Board, 1996, 222p., For selected paper see 51-1565.

Precipitation (meteorology), Hail prevention, Damage, Turbulent boundary layer, Hailstone growth, Cloud physics, Thunderstorms, Radar echoes, Weather forecasting, Weather modification, Cloud seeding, Computerized simulation, Economic analysis, Meetings

51-1565

Economics of major urban hailstorms.

Charlton, R., Kachman, B., Conference on Hail Damage Mitigation and Hail Science, Bismarck, ND, Mar. 19-20, 1996. Proceedings, Bismarck, North Dakota Atmospheric Resource Board, 1996, p.36-54.

Precipitation (meteorology), Hail, Storms, Turbulent boundary layer, Hailstone structure, Damage, Roofs, Economic analysis, Statistical analysis, Environmental impact, Warning systems

51-1566

Morphological analysis of alpine communities of the north-western Caucasus.

Pokarzhevskaia, G.A., *Folia geobotanica & phytotaxonomica,* 1995, 30(2), p.197-210, Refs. p.205-210.

Plant ecology, Ecosystems, Alpine landscapes, Vegetation patterns, Distribution, Plant tissues, Structural analysis, Growth, Geobotanical interpretation, Russia—Caucasus

51-1567

Parent material depth controls ecosystem composition and function on a riverside terrace in northwestern Alaska.

Binkley, D., Suarez, F., Rhoades, C., Stottlemyer, R., Valentine, D.W., *Ecoscience,* 1995, 2(4), p.377-381, With French summary. 20 refs.

Arctic landscapes, Ecosystems, Nutrient cycle, Vegetation patterns, Terraces, Floodplains, Gravel, Soil formation, Sedimentation, Sampling, Classifications, Statistical analysis, United States—Alaska—Agashashok River

51-1568

Bryophyte vegetation patterns along environmental gradients in continental bogs.

Belland, R.J., Vitt, D.H., *Ecoscience,* 1995, 2(4), p.395-407, With French summary. 50 refs.

Wetlands, Ecosystems, Lichens, Peat, Landforms, Vegetation patterns, Classifications, Permafrost hydrology, Thermokarst, Biogeography

51-1569

Woody root system development of white spruce layerings in a tundra environment.

Fayle, D.C.F., Scott, P.A., *Ecoscience,* 1995, 2(4), p.408-414, With French summary. 28 refs.

Forest tundra, Tundra soils, Tundra vegetation, Trees (plants), Plant ecology, Roots, Layers, Growth, Vegetation patterns, Plant tissues, Sampling, Age determination

51-1570

Rigid H_2O molecule model of anomalous thermal expansion of ices.

Katrusiak, A., *Physical review letters,* Nov. 18, 1996, 77(21), p.4366-4369, 38 refs.

Ice physics, Ice structure, Molecular structure, Proton transport, Molecular energy levels, Hydrogen bonds, Ice models, Thermal expansion, Temperature effects

51-1571

Effects of soil temperature on the nitrogen economy and growth of mountain birch seedlings near its presumed low temperature distribution limit.

Karlsson, P.S., Nordell, K.O., *Ecoscience,* 1996, 3(2), p.183-189, With French summary. 42 refs.

Plant ecology, Trees (plants), Growth, Biomass, Nutrient cycle, Forest lines, Soil temperature, Temperature effects, Cold weather tests, Seasonal variations

51-1572

Initiation of a sloping mire complex in southwestern Finland: autogenic *versus* allogenic controls.

Korhola, A., *Ecoscience,* 1996, 3(2), p.216-222, With French summary. 37 refs.

Subarctic landscapes, Soil formation, Peat, Swamps, Sedimentation, Geochronology, Stratigraphy, Sampling, Radioactive age determination, Climatic factors, Finland—Lammansmossen

51-1573

Some features of flexural-gravity wave propagation in the presence of a crack in sheet ice.
Bukatov, A.E., Zav'ialov, D.D., *Fluid dynamics,* Sep. 1996, 31(2), p.284-289, Translated from Akademiia nauk. Izvestiia. Mekhanika zhidkosti i gaza. 8 refs.
Ice mechanics, Floating ice, Ice sheets, Ice water interface, Ice solid interface, Crack propagation, Wave propagation, Ice elasticity, Gravity waves, Ice models, Ice override, Mathematical models

51-1574

New observations on Tilopteridaceae (Phaeophyceae). II. Culture studies determine *Phaeosiphoniella* as an arctic species and crusts as systems for perennation and propagation.
Kuhlenkamp, R., *Phycologia,* May 1996, 35(3), p.225-233, 34 refs.
Biogeography, Algae, Phenology, Ecosystems, Classifications, Distribution, Structural analysis, Sampling, Cold tolerance, Growth, Temperature effects

51-1575

Palaeoentomology of the Kap København Formation, a Plio-Pleistocene sequence in Peary Land, North Greenland.
Böcher, J., *Meddelelser om Grønland. Geoscience,* 1995, No.33, 82p., Refs. p.73-76.
Pleistocene, Geological surveys, Subpolar regions, Arctic landscapes, Paleoecology, Paleobotany, Fossils, Classifications, Distribution, Stratigraphy, Quaternary deposits, Correlation, Greenland—Peary Land

51-1576

Inelastic incoherent neutron scattering study of the pressure dependence of ice VII and VIII.
Li, J.C., Adams, M., *Europhysics letters,* June 20, 1996, 34(9), p.675-680, 31 refs.
Ice physics, High pressure ice, Neutron scattering, Ice spectroscopy, Spectra, High pressure tests, Stability, Molecular structure, Hydrogen bonds

51-1577

Pilots can minimize the likelihood of aircraft roll upset in severe icing.
Dow, J.P., Sr., *Flight safety digest,* Jan. 1996, 15(1), p.1-9.
Aircraft icing, Performance, Ice detection, Accidents, Safety, Countermeasures, Supercooled clouds, Cloud droplets, Ice accretion, Classifications

51-1578

Turboprop freighter crashes after severe icing causes multiple engine failures. *Flight Safety Foundation. Accident prevention,* June 1995, 52(6), 5p.
Aircraft icing, Accidents, Safety, Performance

51-1579

Airframe icing and Captain's improper use of autoflight system result in stall and loss of control of commuter airplane.
Lawton, R., *Flight Safety Foundation. Accident prevention,* Nov. 1994, 51(11), 7p.
Aircraft icing, Ice detection, Performance, Stability, Accidents, Safety, Human factors

51-1580

Rejected takeoff in icy conditions results in runway overrun. *Flight Safety Foundation. Accident prevention,* May 1995, 52(5), 8p.
Aircraft icing, Performance, Velocity measurement, Accuracy, Ice cover effect, Electric heating, Safety, Human factors

51-1581

Heat transfer and ice formations deposited upon cold tube bundles immersed in flowing water. I. Convection analysis.
Intemann, P.A., Kazmierczak, M., *International journal of heat and mass transfer,* Feb. 1997, 40(3), p.557-572, 15 refs.
Ice physics, Ice formation, Pipes (tubes), Ice solid interface, Ice water interface, Convection, Heat transfer, Phase transformations, Ice volume, Simulation, Ice cover effect, Topographic effects

51-1582

Heat transfer and ice formations deposited upon cold tube bundles immersed in flowing water. II. Conjugate analysis.
Kazmierczak, M., Intemann, P.A., *International journal of heat and mass transfer,* Feb. 1997, 40(3), p.573-588, 10 refs.
Ice physics, Ice formation, Ice structure, Pipes (tubes), Ice water interface, Ice cover effect, Phase transformations, Heat transfer coefficient, Ice thermal properties, Thermal conductivity, Boundary value problems, Topographic effects, Mathematical models

51-1583

Application of 1-38 μm imagery for thin cirrus detection in daytime imagery collected over land surfaces.
Hutchison, K.D., Choe, N.J., *International journal of remote sensing,* Nov. 20, 1996, 17(17), p.3325-3342, 24 refs.
Cloud cover, Climatology, Spaceborne photography, Radiometry, Detection, Classifications, Snow cover effect, Image processing, Ice crystal optics, Albedo, Statistical analysis

51-1584

High resolution imagery from the Russian KATE-200 satellite camera: morphology and dynamics of ice masses in the European high Arctic.
Dowdeswell, J.A., Gorman, M.R., Macheret, IU.IA., Glazovskiĭ, A.F., Moskalevskiĭ, M.IU., *International journal of remote sensing,* Nov. 20, 1996, 17(17), p.3343-3356, 25 refs.
Spaceborne photography, Geophysical surveys, Glacier surveys, Sea ice distribution, Ice sheets, Topographic features, Resolution, Photointerpretation, Photographic equipment

51-1585

Cathodic protection of aboveground storage tanks in an arctic environment.
Barletta, T., Bayle, R., Kennelley, K., *Materials performance,* May 1996, 35(5), p.17-22.
Petroleum industry, Oil storage, Storage tanks, Cold weather performance, Corrosion, Protection, Countermeasures, Permafrost beneath structures, Electrical resistivity, Electric charge, Equipment, Design, Winter maintenance

51-1586

Environmental sensitive sanding and deicing practices—final report.
Chang, N.Y., et al, Colorado. Colorado Department of Transportation. Colorado Transportation Institute. Report 95-5, Denver, Mar. 1995, 182p. + appends., 139 refs.
Road maintenance, Winter maintenance, Road icing, Salting, Sanding, Ice removal, Snow removal equipment, Snowmelt, Runoff, Water pollution, Environmental impact, Environmental protection, Cold weather operation

51-1587

Mass balance study: the Devon Island ice cap, Canada.
Koerner, R.M., London, University of London, 1966, 340p., Ph.D. thesis. Refs. p.323-333.
Glaciology, Glacier surveys, Glacier mass balance, Seasonal variations, Glacial hydrology, Ice sheets, Firn, Glacier ablation, Air ice water interaction, Glacial meteorology, Snow cover effect, Stratigraphy, Canada—Northwest Territories—Devon Island

51-1588

Potential cutaneous effects of stratospheric ozone depletion.
Epstein, J.H., *Environmental reviews,* 1996, 4(1), p.1-7, With French summary. Refs. p.5-7.
Ozone, Stratosphere, Ultraviolet radiation, Physiological effects, Health

Recent evidence indicates that there has been a reduction in the stratospheric ozone over the Northern Hemisphere, as well as the antarctic and arctic latitudes. This has resulted in an increased penetration of ultraviolet B (UVB), as measured in Canada since 1989, which could eventually result in an increase in human skin cancer incidence. This would be especially true for the nonmelanoma skin cancers (NMSCs), basal cell carcinomas and squamous cell carcinomas. In addition, the third most common skin cancer, the malignant melanoma, would also increase in incidence. The relationship between UVB radiation and melanoma formation is much less clear than it is for NMSCs. Clinically, people with a loss or lack of melanin protection, such as those with occulocutaneous albinism and vitiligo or, much commonly, people with light skin, eyes, and hair would be at greater risk. (Auth. mod.)

51-1589

Atmospheric ionization by solar particles detected by nitrate measurements in antarctic snow. FY91 AASERT.

Vitt, F.M., Jackman, C.H., *U.S. Air Force Office of Scientific Research. Technical report,* Nov. 1995, AFOSR-TR-96-0223, 37p., ADA-308 179, Refs. p.18-22.

Snow composition, Ionization, Atmospheric composition, Solar activity

The odd nitrogen source strengths associated with solar proton events (SPEs), galactic cosmic rays (GCRs), and the oxidation of nitrous oxide in the Earth's middle atmosphere from 1974 through 1993 have been compared globally, at middle and lower latitudes (<50°), and polar regions (>50°) with a two-dimensional (2-D) photochemical transport model. As discovered previously, the oxidation of nitrous oxide dominates the global odd nitrogen source while GCRs and SPEs are significant at polar latitudes. The horizontal transport of odd nitrogen, produced by the oxidation of nitrous oxide at latitudes <50°, was found to be the dominant source of odd nitrogen in the polar regions with GCRs contributing substantially during the entire solar cycle. The source of odd nitrogen from SPEs was more sporadic; however, contributions during several years (mostly near solar maximum) were significant in the polar middle atmosphere. (Auth.)

51-1590

Sediment formation in polar submarine environments.

Danilov, I.D., *Lithology and mineral resources,* July-Aug. 1991(Pub. Mar. 92), 26(4), p.340-351, Translated from Litologiia i poleznye iskopaemye, Vol.26, No.4, July-Aug. 1991, p.51-65. 15 refs.

DLC TN1.L5413 26 Jan.-Oct. 1991

Ocean bottom, Bottom sediment, Marine deposits, Alluvium, Glacial deposits, Ice rafting, Sediment transport, Subsea permafrost, Frozen ground chemistry, Diagenesis, Lithology

51-1591

Cryogenic processes in the granulometric composition of sedimentary formations.

IUrov, IU.L., *Lithology and mineral resources,* May-June 1994(Pub. Jan. 95), 29(3), p.294-304, Translated from Litologiia i poleznye iskopaemye, Vol.29, No.3, 1994, p.116-128. 19 refs.

DLC TN1.L5413 29 1994

Permafrost weathering, Frost weathering, Moraines, Cryogenic soils, Soil formation, Soil structure, Soil dating, Grain size, Particle size distribution, Statistical analysis, Russia—Kola Peninsula

51-1592

Contributions of ERS-1 to sea ice observation on an ocean-wide scale. [Apports d'ERS-1 à l'observation des glaces de mer à l'échelle océanique]

Cavanié, A., Ezraty, R., Gohin, F., *Monaco. Institute océanographique. Mémoires,* 1994, No.18, Les nouvelles frontières de la télédétection océanique (New frontiers in ocean remote sensing), p.99-106, In French with English summary. 5 refs.

DLC GC10.4.R4N68 1994

Ice surveys, Ice reporting, Ice detection, Sea ice distribution, Ice conditions, Ice edge, Ice structure, Radiometry, Synthetic aperture radar, Backscattering, Spaceborne photography

The scatterometer, the microwave radiometer and the synthetic aperture radar, in wave mode, of the European satellite ERS-1 were primarily designed to measure met-oceanographic parameters at the sea surface. Over both polar caps these instruments provide new and complementary data to describe sea-ice. The scatterometer provides information on the nature, coverage and extent of sea ice at the polar cap scale. The microwave radiometer allows a limited but precise location of the ice edge and a description of the marginal zone, while the imagettes of the SAR permit sea-ice texture analysis over a limited area. The synergetic use of the data of these sensors during the ERS-1 and ERS-2 missions should provide new and valuable information on the sea-ice regime of both polar caps. (Auth.)

51-1593

More comprehensive view of the dynamics of arctic sea ice as revealed through 85.5 GHz SSM/I imagery.

Agnew, T.A., Le, H., *National Snow and Ice Data Center, University of Colorado, Boulder. NSDIC notes,* Fall 1996, No.19, p.3-4, 4 refs.

Ice surveys, Sea ice distribution, Drift, Spaceborne photography

51-1594

Utilization of large aircraft in the Antarctic.

Higashi, A., *Polar news,* Aug. 1996, No.63, p.48-54, In Japanese. 4 refs.

Logistics, Airplanes, Ice runways, Snow compaction, Snow roads, Trafficability, Antarctica

A general review is presented of the main types of large aircraft and the runways to accommodate them in the Antarctic. The main types of aircraft described, with their maximum takeoff weight (MTW) and cruising speed, are the Pilatus Porter PC-6 (2.8 tons, 115 knots), Twin Otter DHC-6 (5.7 tons, 135 knots), Lockheed C-130 Hercules (79.4 tons, 300 knots), Jumbojet C-141 Starlifter (144 tons, 430 knots), and Ilyushin IL-76T (190 tons, 400 knots). Skis have been used regularly with the PC-6 and DHC-6 and on a trial basis with the C-130, but would be impractical with the C-141 or IL-76T. The construction of groomed skiways, that is, compacted snow runways for ski-equipped aircraft and the feasibility of natural bare ice runways for heavier and faster, wheeled aircraft, are also discussed.

51-1595

Stable isotopic composition of antarctic air moisture and precipitation.

Schwarz, G., Ohm, K., Yamanouchi, T., Furukawa, T., Kowski, P., Gernandt, H., *Antarctic record,* July 1996, 40(2), p.169-178, With Japanese summary. 15 refs.

Isotope analysis, Moisture, Precipitation (meteorology), Atmospheric circulation, Snow composition, Sea ice, Ice edge, Antarctica—Showa Station

First results of stable isotope analyses which were obtained by sampling of air moisture and precipitation at Showa Station and Dome Fuji are presented. The isotopic compositions, expressed in delta values of deuterium and ^{18}O relative to the standard mean ocean water (SMOW), are scattered over a wide range of magnitudes. A weak, but significant, quantitative relationship between $\delta^{18}O$ of precipitation at Showa and the distance to open sea was found. Extreme high isotopic delta values appear at both stations when air is transported from lower latitudes to the antarctic continent. These preliminary results were obtained from observations in Jan. 1995. They will be continued at these stations until about Jan. 1997. (Auth. mod.)

51-1596

Measurements and experiments on geomorphic processes in antarctic ice-free mountains: a review.

Matsuoka, N., *Antarctic record,* July 1996, 40(2), p.179-201, In Japanese with English summary. Refs. p.198-201.

Geomorphology, Glacial geology, Moraines, Weathering, Wind erosion, Frost heave, Slope processes, Patterned ground, Data processing, Antarctica—Sør Rondane Mountains

The dynamic approaches to geomorphic processes in antarctic ice-free areas, most of which lie in the cold desert zone, are reviewed. A variety of methodologies have been used to measure rock weathering, wind erosion, frost heave, slope processes and patterned ground formation. Whereas a number of attempts have been made to quantify rates of erosion or mass movements, difficulties in long-term, continuous monitoring have hindered understanding of the physical processes that control the rates. Recent progress in automated data logging techniques enables the authors to acquire data on the timing and cause of geomorphic changes. These data, combined with cosmogenic exposure ages, are applied to the reconstruction of Late Cenozoic landscape evolution. It is suggested that experimental techniques should be standardized to promote intersite comparisons of morphogenetic environments. (Auth. mod.)

51-1597

Meteorological observations at Syowa Station in 1993 by the 34th Japanese Antarctic Research Expedition.

Takao, T., Koike, J., Kamata, Y., Sugita, O., Sakurai, K., *Antarctic record,* July 1996, 40(2), p.202-246, In Japanese with English summary. 6 refs.

Weather observations, Air temperature, Stratosphere, Ozone, Meteorological instruments, Snowstorms, Seasonal variations, Ultraviolet radiation, Antarctica—Showa Station

Results of meteorological observations, carried out by JARE-34 from Feb. 1, 1993 to Jan. 31, 1994 at Showa Station, are as follows: annual mean surface air pressure and temperature were somewhat lower than normal; blizzards occurred 34 times, and there was a record strong blizzard in Dec.; in the stratosphere, air temperature was very low in winter and spring; the deepest ozone hole to date was observed. Total ozone recorded 140 m atm-cm on Oct. 11, the lowest ever at Showa Station; and with the Brewer spectrophotometer, solar spectral UV irradiance was observed throughout the year. Data are presented in numerous tables and charts. (Auth. mod.)

51-1598

Report on workshop "Study of the Antarctic ice sheet and glacier using ERS-1/JERS-1 SAR data".

Hirasawa, N., Takahashi, A., Watanabe, O., Sato, N., *Antarctic record,* July 1996, 40(2), p.255-258, In Japanese with English summary. 3 refs.

Spaceborne photography, Imaging, Ice sheets, Ice conditions, Image processing, Data processing

The main purpose of the workshop was to discuss recent results of antarctic research using SAR data. The workshop was held on Feb. 6, 1996 at the National Institute of Polar Research; the number of participants was about 30. The contents of the workshop consisted of demonstration of various SAR images, comparison with pictures from an airplane and visible images, comparison with observational data on ice conditions, and discussion of problems in interferometry. (Auth. mod.)

51-1599

Viscoplastic modeling of texture development in polycrystalline ice with a self-consistent approach: comparison with bound estimates.

Castelnau, O., Duval, P., Lebensohn, R.A., Canova, G.R., *Journal of geophysical research,* June 10, 1996, 101(B6), p.13,851-13,868, 72 refs.

Ice crystal growth, Ice deformation, Ice cores, Mathematical models, Antarctica—Vostok Station, Antarctica—Byrd Station, Antarctica—Charlie, Dome

An anisotropic viscoplastic self-consistent (VPSC) approach is used for predicting texture development and mechanical behavior of polycrystalline ice. Results are compared with lower and upper bound estimations. It is assumed that ice crystals deform by basal, prismatic, and pyramidal slip. The resistance of each slip system is determined from experimental data on monocrystals and isotropic polycrystals. The VPSC model can predict the behavior of isotropic polycrystalline ice on both the macroscopic and microscopic scale. This is not the case for the lower and upper bounds. Fabrics simulated in uniaxial extension and compression are qualitatively similar for all models. However, large differences in the rate of fabric development are found. This is explained by the different interaction stiffness between grain and matrix. Fabric concentration obtained with the VPSC model for uniaxial deformation is in close agreement with those observed in polar ices. In simple shear, the single maximum fabric found *in situ* cannot be reproduced without an extensive (and probably unrealistic) activity of nonbasal systems. The preferential growth of grains well oriented for basal glide associated with rotation recrystallization could be at the origin of the discrepancy between model results and natural simple shear fabrics. Distorted grain shape slightly slows fabric development. Cores from several antarctic locations are used to explain this technique. (Auth. mod.)

51-1600

ISLSCP Initiative I global datasets: surface boundary conditions and atmospheric forcings for land-atmosphere studies.

Sellers, P.J., et al, *American Meteorological Society. Bulletin,* Sep. 1996, 77(9), p.1987-2005, 26 refs.

Climatology, Atmospheric boundary layer, Soil air interface, Computer programs, Meteorological data, Classifications, Seasonal variations, Snow surveys, Snow cover distribution, Snow depth, Models

51-1601

Antarctic First Regional Observing Study of the Troposphere (FROST) Project.

Turner, J., et al, *American Meteorological Society. Bulletin,* Sep. 1996, 77(9), p.2007-2032, 54 refs.

Synoptic meteorology, Polar atmospheres, Marine atmospheres, Remote sensing, Spacecraft, Weather forecasting, Atmospheric circulation, Atmospheric pressure, Data processing

An account is given of the Antarctic First Regional Observing Study of the Troposphere (FROST) project, which has been organized by the Physics and Chemistry of the Atmosphere Group of the Scientific Committee on Antarctic Research. The goals of FROST are to study the meteorology of the Antarctic, to determine the strengths and weaknesses of operational analyses and forecasts over the continent and in the surrounding ocean areas, and to assess the value of new forms of satellite data that are becoming available. FROST is based around three one-month special observing periods for which comprehensive datasets have been established of model fields and *in situ* satellite observations. (Auth. mod.)

51-1602

"Overall" cloud and snow cover effects on internal climate variables: the use of clear sky climatology.

Groĭsman, P.IA., Genikhovich, E.L., Zhai, P.M., *American Meteorological Society. Bulletin,* Sep. 1996, 77(9), p.2055-2065, 38 refs.

Climatology, Models, Snow cover effect, Snow air interface, Atmospheric boundary layer, Cloud cover, Transparence, Climatic factors, Heat flux, Classifications, Statistical analysis

51-1603

Colour alteration, thermal maturity, and burial diagenesis in fossil foraminifers.

McNeil, D.H., Issler, D.R., Snowdon, L.R., *Canada. Geological Survey. Bulletin,* 1996, No.499, 34p., With French summary. 36 refs.

Paleoecology, Fossils, Geological surveys, Hydrocarbons, Quaternary deposits, Reservoirs, Exploration, Mineralogy, Diagenesis, Geochemistry, Correlation, Sampling, Canada—Northwest Territories—Mackenzie Delta

51-1604

Fluvial geomorphic character of the low reaches of major Mackenzie River tributaries, Fort Simpson to Norwan Wells, Northwest Territories.

Brooks, G.R., *Canada. Geological Survey. Bulletin,* 1996, No.493, 89p., With French summary. Refs. p.23-27.

River basins, Discontinuous permafrost, Geomorphology, Geological surveys, River flow, Hydraulics, Deltas, Shoreline modification, Channels (waterways), Quaternary deposits, Sedimentation, Subarctic landscapes, Canada—Northwest Territories—Mackenzie River

51-1605

Relationship between melting and amorphization of ice.

Mishima, O., *Nature,* Dec. 12, 1996, 384(6609), p.546-549, 17 refs.

Ice melting, Amorphous ice, Compressive properties, Ice crystals, High pressure ice

51-1606

Heavy snowfalls in the territory of Sofia. [Obilni snegovalezhi na teritoriiata na grad Sofiia]

Rachev, G., *Sofiĭski universitet "Sv. Kliment Okhridski." Geologo-geografski fakultet. Godishnik. Kniga 2, Geografiia (St. Kliment Okhridski University of Sofia. Faculty of Geology and Geography. Yearbook. Book 2, Geography),* 1992, Vol.84, p.49-54, In Bulgarian with English and Russian summaries. 3 refs.

DLC G1.G595 1992

Snowstorms, Snowfall, Synoptic meteorology, Bulgaria

51-1607

Overburden pile outside the open-pit as a model of static and dynamic action of an ice sheet on bedrock.

Stankowski, W., *Quaestiones geographicae,* 1984 (Pub. 1988), No.10, p.103-107, 4 refs.

DLC G1.Q3

Glacier beds, Glacier flow, Glacier friction, Glacial erosion, Bedrock, Soil creep, Talus

51-1608

Abrupt decrease of the sea ice over the southern part of the Sea of Okhotsk in 1989 and its relation to the recent weakening of the Aleutian low.

Tachibana, Y., Honda, M., Takeuchi, K., *Meteorological Society of Japan. Journal,* Aug. 1996, 74(4), p.579-584, With Japanese summary. 10 refs.

Marine meteorology, Climatology, Climatic changes, Atmospheric circulation, Sea ice distribution, Ice melting, Atmospheric pressure, Periodic variations, Okhotsk Sea

51-1609

Measurements of ejection velocities in collisional disruption of ice spheres.

Arakawa, M., Higa, M., *Planetary and space science,* Sep. 1996, 44(9), p.901-908, 12 refs.

Extraterrestrial ice, Satellites (natural), Ice mechanics, Spheres, Impact tests, Simulation, Mechanical tests, Ice crystal collision, Ice solid interface, Projectile penetration, Velocity measurement

51-1610

Statistical mechanics of fragmentation processes of ice and rock bodies.

Bashkirov, A.G., Vitiazev, A.V., *Planetary and space science,* Sep. 1996, 44(9), p.909-915, 26 refs.

Extraterrestrial ice, Impact tests, Ice breaking, Cracking (fracturing), Ice crystal collision, Simulation, Rock mechanics, Ice solid interface, Statistical analysis, Classifications

51-1611

Measurements of restitution coefficients of ice at low temperatures.

Higa, M., Arakawa, M., Maeno, N., *Planetary and space science,* Sep. 1996, 44(9), p.917-925, 18 refs.

Extraterrestrial ice, Ice mechanics, Simulation, Spheres, Ice solid interface, Impact tests, Velocity measurement, Statistical analysis, Ice deformation, Phase transformations, Temperature effects

51-1612

Infrared spectra of proton irradiated ices containing methanol.

Moore, M.H., Ferrante, R.F., Nuth, J.A., III, *Planetary and space science,* Sep. 1996, 44(9), p.927-935, 35 refs.

Extraterrestrial ice, Simulation, Ice spectroscopy, Infrared spectroscopy, Ice crystal optics, Spectra, Aerosols, Hydrocarbons, Gamma irradiation, Photochemical reactions, Protons, Classifications

51-1613

Elastic properties of amorphous and crystalline ice films.

Hessinger, J., White, B.E., Jr., Pohl, R.O., *Planetary and space science,* Sep. 1996, 44(9), p.937-944, 46 refs.

Extraterrestrial ice, Amorphous ice, Simulation, Elastic properties, Porosity, Water films, Ice mechanics, Mechanical tests, Shear modulus, Internal friction, Ice solid interface, Thermal conductivity

51-1614

Emissivity of volatile ices on Triton and Pluto.

Stansberry, J.A., Pisano, D.J., Yelle, R.V., *Planetary and space science,* Sep. 1996, 44(9), p.945-955, 67 refs.

Extraterrestrial ice, Satellites (natural), Ice surface, Ice optics, Simulation, Photochemical reactions, Brightness, Thermal radiation, Radiation absorption, Insolation

51-1615

Possible contribution of organometallic species in the solar system ices. Reactivity and spectroscopy.

Klotz, A., et al, *Planetary and space science,* Sep. 1996, 44(9), p.957-965, 35 refs.

Extraterrestrial ice, Simulation, Ice composition, Ice spectroscopy, Electron microscopy, Metals, Ionization, Geochemistry, Ice solid interface, Colored ice, Organic nuclei, Structural analysis

51-1616

Formation of cometary subnuclei.

Vitiazev, A.V., *Planetary and space science,* Sep. 1996, 44(9), p.967-971, 13 refs.

Extraterrestrial ice, Cosmic dust, Organic nuclei, Amorphous ice, Ice nuclei, Ice formation, Mass transfer, Ice melting, Models

51-1617

Spectroscopy of some ices of astrophysical interest: SO_2, N_2 and N_2:CH_4 mixtures.

Quirico, E., Schmitt, B., Bini, R., Salvi, P.R., *Planetary and space science,* Sep. 1996, 44(9), p.973-986, 38 refs.

Extraterrestrial ice, Simulation, Satellites (natural), Organic nuclei, Amorphous ice, Ice spectroscopy, Infrared spectroscopy, Phase transformations, Spectra, Classifications, Solid phases

51-1618

P/Wirtanen evolution model.

Capria, M.T., et al, *Planetary and space science,* Sep. 1996, 44(9), p.987-1000, 48 refs.

Extraterrestrial ice, Ice physics, Ice sublimation, Simulation, Spacecraft, Remote sensing, Porous materials, Dust, Vapor diffusion, Grain size, Ice vapor interface, Surface temperature

51-1619

Modeling the gas flux from a Jupiter-family comet nucleus.

Benkhoff, J., Huebner, W.F., *Planetary and space science,* Sep. 1996, 44(9), p.1005-1013, 15 refs.

Extraterrestrial ice, Porous materials, Ice sublimation, Ice erosion, Dust, Vapor diffusion, Computerized simulation, Models, Mass transfer, Photochemical reactions, Insolation

51-1620

Complementary studies on the unexpected activity of comet Schwassmann—Wachmann 1.

Cabot, H., Enzian, A., Klinger, J., Majolet, S., *Planetary and space science,* Sep. 1996, 44(9), p.1015-1020, 27 refs.

Extraterrestrial ice, Porous materials, Phase transformations, Amorphous ice, Heat transfer, Geologic processes, Vapor diffusion, Statistical analysis

51-1621

Pillow lava on Titan: expectations and constraints on cryovolcanic processes.

Lorenz, R.D., *Planetary and space science,* Sep. 1996, 44(9), p.1021-1028, 50 refs.

Extraterrestrial ice, Satellites (natural), Geocryology, Magma, Heat flux, Cooling rate, Regolith, Surface structure, Volcanoes, Mass flow

51-1622

Hiding Titan's ocean: densification and hydrocarbon storage in an icy regolith.

Kossacki, K.J., Lorenz, R.D., *Planetary and space science,* Sep. 1996, 44(9), p.1029-1037, 31 refs.

Extraterrestrial ice, Satellites (natural), Geocryology, Hydrocarbons, Porosity, Geologic processes, Compaction, Natural gas, Mathematical models

51-1623

Spatial distribution of UV-absorbing regions on Triton.

Flynn, B., Stern, A., Buratti, B., Schenk, P., Trafton, L., Mosher, J., *Planetary and space science,* Sep. 1996, 44(9), p.1039-1046, 20 refs.

Extraterrestrial ice, Satellites (natural), Regolith, Frost, Hydrocarbons, Radiation absorption, Ultraviolet radiation, Spaceborne photography, Image processing, Distribution

51-1624

Water ice in primitive asteroids?

Barucci, M.A., Fulchignoni, M., Lazzarin, M., *Planetary and space science,* Sep. 1996, 44(9), p.1047-1049, 23 refs.

Extraterrestrial ice, Ice detection, Ice spectroscopy, Phase transformations, Geologic processes

51-1625

Model for the overabundance of methane in the atmospheres of Pluto and Triton.

Stansberry, J.A., Spencer, J.R., Schmitt, B., Benchkoura, A.I., Yelle, R.V., Lunine, J.I., *Planetary and space science,* Sep. 1996, 44(9), p.1051-1063, 54 refs.

Extraterrestrial ice, Satellites (natural), Regolith, Natural gas, Geocryology, Frozen liquids, Ice sublimation, Mass transfer, Buoyancy

51-1626

Studies on the climate, environment, and regional development of China's arid and semiarid regions. Collected papers. [Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu lunwenji]

Li, J.F., ed, Beijing, Qixiang chubanshe (Meteorology Press), 1990, 238p., In Chinese with English table of contents on p.237-238. Refs. passim. Presented at a symposium held in Urumqi, Sep. 22-27, 1988. For selected papers see 51-1627 through 51-1662.

DLC QC993.7.C48 1990 Orien China

Deserts, Steppes, Precipitation (meteorology), Air temperature, Climatic changes, Desiccation, Paleoclimatology, Water reserves, Regional planning, China

51-1627

Distribution of the Chinese arid regions and its cause of formation.

Cui, Z., Qian, Y.F., Zhang, Y.G., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.16-23, In Chinese. 5 refs.

DLC QC993.7.C48 1990 Orien China

Deserts, Steppes, Desiccation, Precipitation (meteorology), Atmospheric circulation, Climatic changes, China

51-1628

Multiannual variations of circulation indexes over East Asia and dry and wet conditions in spring over northwest and north of China.

Chen, W.L., Yu, Y.X., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.24-28, In Chinese. 5 refs.

DLC QC993.7.C48 1990 Orien China

Atmospheric circulation, Humidity, Precipitation (meteorology), Climatic changes, Statistical analysis, China

51-1629

Large-scale anomaly over North Atlantic Ocean surface temperature and its influence on the plenty or deficiency of spring runoff in north Xinjiang.

Zhang, X.P., Fan, Z.X., Zhou, E.J., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.29-33, In Chinese. 3 refs.

DLC QC993.7.C48 1990 Orien China

Atmospheric circulation, Water temperature, Surface temperature, Air water interactions, Precipitation (meteorology), Runoff forecasting, China—Xinjiang

51-1630

Drought features in North China from the point of viewpoint that drought is a slowly accumulative process.

Jiao, Y.Z., An, S.Q., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.34-37, In Chinese.

DLC QC993.7.C48 1990 Orien China

Precipitation (meteorology), Desiccation, Climatic changes, Meteorological data, Statistical analysis, China

51-1631

Meteorological countermeasure for exploiting the precipitation resources in North China.

Zhou, M.S., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.38-41, In Chinese. 5 refs.

DLC QC993.7.C48 1990 Orien China

Precipitation (meteorology), Water retention, Water reserves, Soil conservation, Land reclamation, China

51-1632

Precipitation regressive models in summer in north-western drought area of China for the calculation using satellite data.

Liu, Y.F., Chen, W.M., Wang, Y., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.42-49, In Chinese. 2 refs.

DLC QC993.7.C48 1990 Orien China

Precipitation (meteorology), Deserts, Steppes, Water reserves, Spaceborne photography, Meteorological data, Statistical analysis, China

51-1633

On the dry climate in Xinjiang.

Zhang, J.C., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.56-59, In Chinese. 4 refs.

DLC QC993.7.C48 1990 Orien China

Deserts, Steppes, Precipitation (meteorology), Evaporation, Water balance, China—Xinjiang

51-1634

Trend of climate change during the past hundred years in Xinjiang.

Tu, Q.P., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.60-66, In Chinese. 5 refs.

DLC QC993.7.C48 1990 Orien China

Deserts, Steppes, Precipitation (meteorology), Desiccation, Climatic changes, Paleoclimatology, Meteorological data, Statistical analysis, China—Xinjiang

51-1635

Question to Xinjiang drought trend.

Li, J.F., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.67-72, In Chinese. 9 refs.

DLC QC993.7.C48 1990 Orien China

Deserts, Steppes, Precipitation (meteorology), Desiccation, Glacier oscillation, Snow line, Water reserves, Climatic changes, Meteorological data, Statistical analysis, China—Xinjiang

51-1636

Influence of drought on water resources in Hebei Province.

Gong, R., Ma, Y.H., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.73-77, In Chinese. 4 refs.

DLC QC993.7.C48 1990 Orien China

Precipitation (meteorology), Desiccation, Climatic changes, Water reserves, Paleoclimatology, Meteorological data, Statistical analysis, China—Hebei Province

51-1637

Characteristics of temporal-spatial distribution of precipitation in Xinjiang.

Li, Y.Q., Zhang, X.P., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.86-88, In Chinese. 3 refs.

DLC QC993.7.C48 1990 Orien China

Precipitation (meteorology), Climatic changes, Meteorological data, Statistical analysis, China—Xinjiang

51-1638

One-dimensional dynamic model of the land-air system and its application to Xinjiang.

Yang, D., Cao, H.X., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.89-93, In Chinese. 8 refs.

DLC QC993.7.C48 1990 Orien China

Deserts, Steppes, Precipitation (meteorology), Desiccation, Climatic changes, Soil water, Soil temperature, Soil air interface, Air temperature, Computerized simulation, China—Xinjiang

51-1639

Wind energy resources in Xinjiang.

Sang, X.C., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.94-99, In Chinese. 1 ref.

DLC QC993.7.C48 1990 Orien China

Wind power generation, Wind velocity, Wind pressure, Natural resources, Electric power, Economic development, China—Xinjiang

51-1640

Xinjiang snowfall resources.

Wang, C.Y., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.100-103, In Chinese. 2 refs.

DLC QC993.7.C48 1990 Orien China

Snowfall, Snow accumulation, Snow cover distribution, Precipitation (meteorology), Climatic changes, China—Xinjiang

51-1641

Water resources of northern Xinjiang.

Wen, K.D., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.104-106, In Chinese. 2 refs.

DLC QC993.7.C48 1990 Orien China

Surface waters, Ground water, Water reserves, Natural resources, Regional planning, China—Xinjiang

51-1642

Transform of resources of the precipitation in northern Xinjiang and evaluation of the resource utilized probability.

Nan, Q.H., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.107-111, In Chinese. 3 refs.

DLC QC993.7.C48 1990 Orien China

Precipitation (meteorology), Water reserves, Water balance, Runoff forecasting, Natural resources, Regional planning, China—Xinjiang

51-1643

Precipitation changes of hundred years and precipitation forecast in north Xinjiang.

Yuan, Y.J., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.112-116, In Chinese. 4 refs.

DLC QC993.7.C48 1990 Orien China

Precipitation (meteorology), Climatic changes, Paleoclimatology, Meteorological data, Statistical analysis, China—Xinjiang

51-1644

Resources and feature of precipitation in Beijiang.

Ma, S.J., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.117-121, In Chinese. 2 refs.

DLC QC993.7.C48 1990 Orien China

Precipitation (meteorology), Water reserves, Water balance, Natural resources, Regional planning, Meteorological data, Statistical analysis, China—Xinjiang

51-1645

Water and heat resources in Takelamagan.

Li, J.F., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.122-125, In Chinese. 2 refs.

DLC QC993.7.C48 1990 Orien China

Deserts, Precipitation (meteorology), Ground water, Water balance, Water reserves, Air temperature, Humidity, Heat balance, Heat recovery, China—Taklimakan Desert

51-1646

Solar radiation features of winter in Manxi of Taklamakan Desert.

Hu, L.Q., He, Q., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.126-130, In Chinese. 4 refs.

DLC QC993.7.C48 1990 Orien China

Deserts, Solar radiation, Insolation, Atmospheric attenuation, Atmospheric density, Dust, Turbidity, Sunlight, Light scattering, China—Taklimakan Desert

51-1647

Climatic characteristics of Tarim Basin.

Sun, X.B., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.131-135, In Chinese.

DLC QC993.7.C48 1990 Orien China

Deserts, Air temperature, Humidity, Precipitation (meteorology), Climatic factors, China—Tarim Basin

51-1648

Comparative analysis of climatic changes in reclamation areas along the Tarim River.

Ling, Z.Z., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.136-139, In Chinese.

DLC QC993.7.C48 1990 Orien China

Deserts, Precipitation (meteorology), Humidity, Air temperature, Climatic changes, Land reclamation, China—Xinjiang

51-1649
Simulation on growing season of Tarim Basin and the surrounding area.
Wang, Q.X., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.140-143, In Chinese. 3 refs.
DLC QC993.7.C48 1990 Orien China
Agriculture, Plant ecology, Acclimatization, Phenology, Climatic factors, Regional planning, China—Xinjiang

51-1650
Relation of rise and decline of Manasi River with meteorological element in summer.
Lu, J., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.144-147, In Chinese. 3 refs.
DLC QC993.7.C48 1990 Orien China
Precipitation (meteorology), Air temperature, Snowmelt, Climatic factors, River flow, Stream flow, Runoff forecasting, China—Xinjiang

51-1651
Reliable exploitation, utilization and preservation of oasis climatic resources in Hexi Corridor.
Xu, G.C., Ren, J., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.148-152, In Chinese. 10 refs.
DLC QC993.7.C48 1990 Orien China
Deserts, Steppes, Solar radiation, Insolation, Sunlight, Heat recovery, Water reserves, Economic development, Land development, China—Qilian Mountains

51-1652
Climatic changes over the last 400 years in the arid and semiarid regions along the Great Wall in northern Shaanxi.
Li, Z.Y., Zheng, D., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.157-159, In Chinese. 3 refs.
DLC QC993.7.C48 1990 Orien China
Air temperature, Climatic changes, Paleoclimatology, Meteorological data, Statistical analysis, China—Shaanxi Province

51-1653
Some problems about the environmental influences in developing and utilizing the water resources in Xinjiang.
Yan, K.G., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.160-162, In Chinese.
DLC QC993.7.C48 1990 Orien China
Ground water, Water reserves, Land development, Economic development, Environmental impact, China—Xinjiang

51-1654
Study on the environmental evolution of Holocene epoch and its cause in south part of Xinjiang.
Chen, Y.N., Wang, Z.C., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.163-165, In Chinese. 7 refs.
DLC QC993.7.C48 1990 Orien China
Deserts, Paleoclimatology, Desiccation, Climatic changes, China—Xinjiang

51-1655
Acid rain present and trend in Harbin area.
Zhang, Y.Q., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.166-169, In Chinese. 5 refs.
DLC QC993.7.C48 1990 Orien China
Air pollution, Atmospheric composition, Atmospheric circulation, Precipitation (meteorology), Scavenging, China—Harbin

51-1656
Changes of Quaternary environment in Karakoram and west Kunlun Mountains.
Ai, D., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.170-173, In Chinese. 3 refs.
DLC QC993.7.C48 1990 Orien China
Alpine glaciation, Glacial geology, Glacial deposits, Glacier oscillation, Quaternary deposits, Paleoclimatology, China—Karakoram Mountains, China—Kunlun Mountains

51-1657
Discussion the Quaternary glaciation and environment change of west Kunlun Mountains.
Wang, Z.C., Su, Z., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.174-178, In Chinese. 2 refs.
DLC QC993.7.C48 1990 Orien China
Alpine glaciation, Glacial geology, Glacial deposits, Moraines, Quaternary deposits, Glacial meteorology, Geochronology, Paleoclimatology, China—Kunlun Mountains

51-1658
Researches on the influence of atmospheric dust over Urumqi City.
Dou, Y.J., Han, L.S., Shi, Z.Y., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.183-188, In Chinese. 4 refs.
DLC QC993.7.C48 1990 Orien China
Air pollution, Dust, Urban planning, Meteorological data, Statistical analysis, China—Xinjiang

51-1659
Distribution of glacier resources in the south of Tarim Basin, Xinjiang.
Yang, H.A., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.206-211, In Chinese. 7 refs.
DLC QC993.7.C48 1990 Orien China
Mountain glaciers, Glacier surveys, Glacial hydrology, Glacial rivers, Meltwater, Runoff, Water reserves, China—Kunlun Mountains, China—Tarim Basin

51-1660
Characteristics of modern glacier development at the north slope of Qogir peak in Mt. Karakoram.
Wang, Z.C., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.212-218, In Chinese. 5 refs.
DLC QC993.7.C48 1990 Orien China
Mountain glaciers, Glacier surveys, Glacier oscillation, Glacier alimentation, Glacial meteorology, China—Karakoram Mountains

51-1661
Preliminary study of the characteristics of desertification on the oases of Kashi and Hetian prefectures, Xinjiang.
Qian, Y.B., Zhou, X.J., Ji, Q.H., Li, C.S., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.219-222, In Chinese. 2 refs.
DLC QC993.7.C48 1990 Orien China
Deserts, Wind erosion, Soil erosion, Desiccation, Human factors, Climatic changes, China—Xinjiang

51-1662
Bearing capacity and rational application of water resources in Urumqi.
Chen, Z.J., Wei, W.S., Zhongguo ganhan, banganhan diqu qihou, huanjing yu qiyu kaifa yanjiu (Studies on the climate, environment, and regional development of China's arid and semiarid regions). Edited by J.F. Li, Beijing, Qixiang chubanshe (Meteorology Press), 1990, p.223-227, In Chinese.
DLC QC993.7.C48 1990 Orien China
Deserts, Water reserves, Water supply, Regional planning, China—Xinjiang

51-1663
Global sea-level rise: past and future.
Raper, S.C.B., Wigley, T.M.L., Warrick, R.A., Sea-level rise and coastal subsidence: causes, consequences, and strategies. Edited by J.D. Milliman and B.U. Haq. Vol.2, Dordrecht, Netherlands, Kluwer Academic Publishers, 1996, p.11-45, Refs. p.35-39.
DLC GC89.S427 1996
Air temperature, Paleoclimatology, Climatic changes, Models, Sea level, Ice sheets, Statistical analysis
This paper reviews observationally based estimates of past global-mean temperature change and sea-level rise from 1880-1990, and compares them with model-based estimates. The climate model used is a simple upwelling-diffusion, energy-balance model, which is coupled to a set of simple ice-melt models to give total sea-level change. For Antarctica, the unweighted global mean temperature change is used. The authors conclude that the temperature has risen by 0.5±0.15°C and sea level has risen by about 10-20 cm.

51-1664
Use of explosives by the US Antarctic Program.
Ensminger, J.T., Blasing, T.J., *Oak Ridge National Laboratory. Environmental report,* June 1995, ORNL/TM-13031, 39p., DE95-016398, Refs. p.36-38.
Low temperature research, Explosion effects, Ice blasting, Seismic surveys, Cold weather construction, Snow, Maintenance, Safety, Environmental impact
This report was prepared to assist principal investigators and others in complying with NEPA and the protocol on environmental protection to the Antarctic Treaty. Research activities and associated support operations in Antarctica sometimes require use of explosives. This report evaluates potential environmental impacts associated with such activities and possible methods for mitigating those impacts. The greatest single use of explosives, and the only type of blasting that will occur on the Polar Plateau (an exception is the rare use of explosives to cave in dangerous ice for safety reasons), is for seismic surveys. The charges for these are small-scale, are placed in or on the snow or ice, are distributed linearly over long distances, and present no potential impacts to soil or geological substrata. Impacts from those would be less than minor or transitory. Wherever possible, blasting holes in sea ice will be replaced by drilling by auger or melting. Other uses of explosives, such as in geologic research and construction, are discussed. (Auth.)

51-1665
On the genesis of mirabilite in the McMurdo Sound region, Antarctica.
Barkov, N.I., Nikolaev, V.I., Strizhov, V.P., *Lithology and mineral resources,* July-Aug. 1995, 30(4), p.374-379, 26 refs. For Russian original see 51-1238 or 24E-56246.
Glacial geology, Ice composition, Marine geology, Moraines, Geochronology, Antarctica—McMurdo Sound
The genesis of mirabilite is considered on the basis of new data on the isotopic composition of oxygen from natural ice and sulfur from mirabilite of moraine deposits in the McMurdo Sound region. It was inferred that both the primarily marine and endogenic sources of this salt were present, but this does not permit one to use the deposits of this salt for paleogeographic reconstructions. (Auth.)

51-1666

Future evolution of the arctic coasts of Russia. [L'évolution future des côtes arctiques de la Russie]

Kaplin, P.A., *Norois*, Jan.-Mar. 1995, 165(42), p.37-48, In French with English summary. 10 refs.

Oceanography, Subpolar regions, Global warming, Sea level, Shoreline modification, Shore erosion, Water level, Geomorphology, Russia

51-1667

Field observations and remote sensing: complementary methods for the study of the arctic ice field. [Observations de terrain et télédétection: des méthodes complémentaires pour l'étude de la banquise arctique]

Griselin, M., Kergomard, C., *Norois*, Apr.-June 1996, 43(170), p.355-373, In French with English summary. 19 refs.

Oceanographic surveys, Ice surveys, Ice detection, Drift, Spaceborne photography, Radiometry, Radio beacons, Telemetering equipment, Performance, Correlation, Arctic Ocean

51-1668

Geotechnical properties of paper mill sludges for use in landfill covers.

Moo-Young, H.K., Zimmie, T.F., *Journal of geotechnical engineering*, Sep. 1996, 122(9), p.768-775, 24 refs.

Waste disposal, Earth fills, Covering, Sludges, Hydraulics, Freeze thaw tests, Freeze thaw cycles, Permeability, Water content, Saturation, Compaction, Performance

51-1669

Effect of temperature on dielectric properties of ice in the range 5-39 GHz.

Matsuoka, T., Fujita, S., Mae, S., *Journal of applied physics*, Nov. 15, 1996, 80(10), p.5884-5890, 28 refs.

Ice physics, Ice dielectrics, Temperature effects, Electrical measurement, Resonance, Remote sensing, Simulation, Infrared radiation, Statistical analysis, Polarization (charge separation)

51-1670

Biogeochemistry of heavy metals in the Arctic.

Dobrovol'skiĭ, V.V., *Moscow University. Soil science bulletin*, 1995, 50(3), p.1-10, 29 refs. For Russian original see 50-3971.

Tundra soils, Tundra vegetation, Plant ecology, Ecosystems, Plant tissues, Soil pollution, Metals, Environmental impact, Environmental tests, Organic soils, Mass transfer, Geochemical cycles, Sampling, Mass transfer

51-1671

Aircraft anti-icing and de-icing techniques and modeling.

Thomas, S.K., Cassoni, R.P., MacArthur, C.D., *Journal of aircraft*, Sep.-Oct. 1996, 33(5), p.841-854, 86 refs.

Aircraft icing, Chemical ice prevention, Ice melting, Ice removal, Ice solid interface, Fluid dynamics, Ice air interface, Air flow, Electric heating, Classifications, Mathematical models

51-1672

Dissolved silicon and phosphorus in the northern Caspian Sea in winter.

Tsytsarin, A.G., *Russian meteorology and hydrology*, 1995, No.11, p.61-67, Translated from Meteorologiia i gidrologiia. 5 refs.

Oceanography, Estuaries, Deltas, Sedimentation, Distribution, Solubility, Organic nuclei, Snow composition, Ice cover effect, Ice water interface, Hydrogeochemistry, Sampling, Caspian Sea

51-1673

High-resolution passive microwave observations of convective systems over the tropical Pacific Ocean.

McGaughey, G., Zipser, E.J., Spencer, R.W., Hood, R.E., *Journal of applied meteorology*, Nov. 1996, 35(11), p.1921-1947, 53 refs.

Precipitation (meteorology), Radiometry, Aerial surveys, Microwaves, Convection, Ice detection, Snow pellets, Brightness, Ice crystal optics, Light scattering, Statistical analysis, Resolution

51-1674

Very large potential temperature lapse rates and low turbulence levels during spring thaw on the prairies.

Leahey, D.M., Hansen, M.C., Schroeder, M.B., *Journal of applied meteorology*, Nov. 1996, 35(11), p.2057-2066, 24 refs.

Plains, Atmospheric boundary layer, Surface energy, Soil air interface, Ice water interface, Meltwater, Regelation, Ground thawing, Turbulence, Diurnal variations, Radiant cooling, Heat transfer, Heat sinks, Temperature measurement

51-1675

Surface energy fluxes of arctic winter sea ice in Barrow Strait.

Steffen, K., DeMaria, T., *Journal of applied meteorology*, Nov. 1996, 35(11), p.2067-2079, 26 refs.

Climatology, Surface energy, Profiles, Marine atmospheres, Sea ice, Turbulent diffusion, Ice air interface, Ice heat flux, Ice cover effect, Ice cover thickness, Heat balance, Meteorological factors, Diurnal variations, Statistical analysis, Canada—Northwest Territories—Barrow Strait

51-1676

Changes of the intensity of the migration of water-soluble substances in soils of tundra and taiga landscapes as related to global climate changes.

Vasil'evskaia, V.D., Pervova, N.E., *Moscow University. Soil science bulletin*, 1995, 50(1), p.1-9, 25 refs. For Russian original see 49-5803.

Subarctic landscapes, Climatic changes, Global change, Global warming, Tundra climate, Tundra soils, Taiga, Hydrogeochemistry, Soil water migration, Sediment transport, Solubility, Temperature effects, Vegetation patterns, Vegetation factors

51-1677

Phosphorus in humic acids in mountain-forest and mountain-meadow soils of the north-west Caucasus.

Makarov, M.I., *Moscow University. Soil science bulletin*, 1995, 50(1), p.34-42, 20 refs. For Russian original see 49-5804.

Alpine landscapes, Forest soils, Organic soils, Soil formation, Forest ecosystems, Soil chemistry, Chemical properties, Sampling, Nuclear magnetic resonance, Geochemical cycles, Russia—Caucasus

51-1678

Mechanisms of the antarctic ozone hole: the Stratéole Experiment. [Les mécanismes du trou d'ozone antarctique: l'expérience stratéole]

Vial, F., *Association de Géographes Français. Bulletin*, Sep. 1996, 73(4), p.304-312, In French with English summary. 4 refs.

Climatology, Polar atmospheres, Stratosphere, Atmospheric composition, Ozone, Degradation, Photochemical reactions, Aerosols

The authors present a report on atmospheric ozone and on mechanisms responsible for the ozone depletion on Antarctica during the end of winter and the beginning of polar spring. Photochemical processes are now well known but there are a lot of uncertainties concerning the transportation of minor constituents playing a role in the chemistry of the atmosphere. The Stratéole experiment will study stratospheric winds, radiation, aerosols and minor constituents and rare gases and their action in the polar lower stratosphere. (Auth. mod.)

51-1679

Polychlorobiphenyls in Antarctica.

Fuoco, R., Colombini, M.P., Ceccarini, A., Abete, C., *Microchemical journal*, Nov. 1996, 54(4), p.384-390, 10 refs.

Oceanography, Water pollution, Hydrocarbons, Environmental impact, Sampling, Marine deposits, Lacustrine deposits, Soil pollution, Pack ice, Ice melting, Turbulent diffusion, Environmental protection, Microelement content, Microanalysis, Antarctica—Ross Sea, Antarctica—Victoria Land

The presence and the distribution of polychlorobiphenyls (PCBs) in antarctic environmental components and the effect of the seasonal formation/melting process of pack ice on the pollution level of seawater were investigated. Seawater, marine, and lake sediment and soil samples were collected in a large area of the Ross Sea and Victoria Land during the 1988-1992 Italian expeditions. The results obtained highlighted a low and quite homogeneous PCB contamination of the studied area. Surface seawater samples from Gerlache Inlet and Wood Bay showed a typical PCB concentration of 130 pg/l, and an increase after pack ice melting of about 30-40%. (Auth. mod.)

51-1680

Attempt to interpret the spread of element concentration in antarctic surface snow: the same element in a given test field, several elements in different sampling fields.

Lanza, F., Bocci, F., Papoff, P., *Microchemical journal*, Nov. 1996, 54(4), p.429-443, 19 refs.

Snow impurities, Snow cover, Sampling, Pollution, Distribution, Chemical analysis, Statistical analysis, Correlation, Accuracy, Environmental tests

Sampling surface snow on a large test field always leads to a spread of analyte concentration data which depends on the nonuniformity of the air-snow interface in the field and on the extent of reproducibility of all the procedures used from sampling to analysis. Consequently a sample relevant to a restricted surface might be poorly representative of the surrounding area. Contamination of the sample during the gathering and storing steps is assumed to be the main source of nonrandom results (outliers). Using various statistical tools the authors were able to evaluate which part of the spread was due to the snow surface nonuniformity in the case of many samples collected in the same test field in Antarctica. In the case of samples gathered in different geographical areas, the possibility of finding correlations among points is greatly enhanced when three or more analytes are considered for each sample. When the same correlation is found for some analytes and a variable tentatively tested, information can be gained about the source of chemical content of snow samples. (Auth. mod.)

51-1681

Dynamics of the Arctic Ocean.

Johannessen, O.M., Oceans and the Poles—European co-operation in ocean and polar research. 2nd edition, Strasbourg, European Science Foundation, Sep. 1993, p.24-27.

Oceanographic surveys, Climatology, Global warming, Sea ice distribution, Ice melting, Ice cover effect, Ocean currents, Research projects, International cooperation, Environmental protection, Arctic Ocean

51-1682

Arctic and antarctic sea ice and its interactions with ocean and the atmosphere.

Johannessen, O.M., Wadhams, P., Oceans and the Poles—European co-operation in ocean and polar research. 2nd edition, Strasbourg, European Science Foundation, Sep. 1993, p.30-33.

Sea ice distribution, Ice cover effect, Air ice water interaction, Albedo, Radiation balance, Ice formation, Ice surveys

The effects of sea ice on ocean and atmospheric circulation and on the global heat budget and through this on world climate are not well understood. The lack of quantitative knowledge of the exchange processes between ocean, ice and atmosphere and on the seasonal variations in the total ice extent, thickness and structure of ice as well as in the amount of open water (polynyas and small leads) between the ice floes are key issues. Key scientific objectives relating to these issues are the following: field investigation of atmosphere-ice-ocean exchange processes from small to regional scales; and variation of the regional and global ice extent, its thickness distribution and open water within the ice pack as an indicator of climate change. (Auth. mod.)

51-1683

Dynamics of large inland ice masses in Antarctica and Greenland.

Drewry, D.J., Oceans and the Poles—European co-operation in ocean and polar research. 2nd edition, Strasbourg, European Science Foundation, Sep. 1993, p.48-53.

Climatology, Ice sheets, Land ice, Ice shelves, Ice cover effect, Air ice water interaction, Sea level, Glacier oscillation

Global eustatic sea levels are controlled directly by the quantity of ice locked in the polar ice sheets: such ice masses have been the predominant influence on sea level over the last twenty million years and have involved height changes of between 50 and 150 m per glacial cycle. The critical links between ice masses and climate have become a major concern. Ice sheets do not simply respond to climate change but are active components; there are strong couplings between ice sheets, the atmosphere, oceans and the lithosphere. Ice sheets tend to interact with climate on long time scales. They contribute to thermal forcing of the atmosphere as a result of high surface albedo, act as a major source/sink of latent heat and have a stabilizing influence on the lower atmosphere. For the world's oceans the antarctic ice sheet, in particular, contributes dense, cold water from melting beneath floating ice shelves. (Auth. mod.)

51-1684

Paleoclimate in polar regions: ice cores, lakes and polar seas sediments.

Lorius, C., Le Pichon, X., Oceans and the Poles—European co-operation in ocean and polar research. 2nd edition, Strasbourg, European Science Foundation, Sep. 1993, p.56-59, 5 refs.

Paleoclimatology, Climatic changes, Sea ice distribution, Glacier oscillation, Glacier mass balance, Ice cores, Marine deposits, Lacustrine deposits, Research projects, Correlation

The importance of paleostudies has in particular been recognized by the establishment of several programs within the International Geosphere Biosphere Project (IGBP). These include PAGES (Past Global Changes), the first core project established within IGBP, and the long record sampling at JGOFS (Joint Global Ocean Flux Study) stations which require long undisturbed cores. High resolution sediment cores in the polar oceans will provide the key to understanding the continental and ice core records and vice-versa. These programs are focused on several time scales: earth history over the past 2,000 years to provide a base time against which human impacts can be measured; glacial-interglacial cycles in the late Quaternary, in particular over the last 150,000 years, to study natural long-term as well as abrupt climatic changes; and a longer time scale (100,000 to 10,000,000 years) taking into account forcing by tectonic changes which provoked the transition to Glacial Climate. (Auth. mod.)

51-1685

Conceptual approach to assessing instream flows in large rivers of the Northern River Basin, Canada.

Hardy, T.B., Northern River Basins Study Instream Flow Needs Workshop. Edmonton, Alberta, Canada, Oct. 14-15, 1993; Jan. 6-7, 1994. Proceedings and Northern River Basins Study Project Report. No.66, Edmonton, Northern River Basins Study, Jan. 1996, p.15-36, Refs. p.29-36.

Ecosystems, Geophysical surveys, River basins, River flow, Flow measurement, Hydraulics, Hydrogeochemistry, Environmental impact, Environmental protection, Canada

51-1686

How high was ice age ice? A rebounding earth may tell.

Kerr, R.A., *Science,* July 8, 1995, 265(5169), p.189.

Pleistocene, Paleoclimatology, Ice sheets, Ice cover thickness, Glacier oscillation, Isostasy, Tectonics, Sea level, Models

51-1687

Seasonal climatic rhythms on the West Siberia Plain.

Filandisheva, L.B., Okisheva, L.N., *Polar geography,* Oct.-Dec. 1995, 19(4), p.267-276, 6 refs.

Climatology, Subpolar regions, Seasonal variations, Classifications, Taiga, Tundra climate, Tundra vegetation, Vegetation patterns, Biomass, Russia—Siberia

51-1688

Concentration of heavy metals in soil and ice samples in Anadyr'.

Tregubov, O.D., Kotov, A.N., *Polar geography,* Oct.-Dec. 1995, 19(4), p.277-283, 8 refs.

Subpolar regions, Hydrogeology, Environmental tests, Metals, Air pollution, Migration, Aerosols, Soil pollution, Snow impurities, Meltwater, Permafrost transformation, Sampling, Correlation, Statistical analysis, Russia—Anadyr'

51-1689

Modeling the climate effect of unrestricted greenhouse emissions over the next 10,000 years.

Kim, K.Y., Crowley, T.J., *Geophysical research letters,* Apr. 15, 1994, 21(8), p.681-684, 23 refs.

Climatology, Greenhouse effect, Global warming, Carbon dioxide, Air temperature, Heat balance, Temperature variations, Models, Long range forecasting

51-1690

Two cores are better than one.

Boulton, G.S., *Nature,* Dec. 9, 1993, 366(6645), p.507-508.

Ice sheets, Ice cores, Drill core analysis, Paleoclimatology, Shear flow, Ice deformation, Stratigraphy, Accuracy, Greenland

51-1691

Ancient climate coolings are on thin ice.

Appenzeller, T., *Science,* Dec. 17, 1993, 262(5141), p.1818-1819.

Paleoclimatology, Pleistocene, Climatic changes, Ice sheets, Ice cores, Isotope analysis, Electrical resistivity, Geochronology, Ice dating, Correlation, Accuracy, Ice age theory, Greenland

51-1692

Paleoclimate of northern Japan during the Last-glacial revealed by a pollen analytical study on the terrace deposits of southern Hokkaido.

Sakaguchi, Y., Katoh, S., *Tokyo. University. Department of Geography. Bulletin,* Dec. 1990, No.22, p.1-16, 15 refs.

DLC G1.T64a

Marine geology, Terraces, Peat, Soil dating, Soil profiles, Palynology, Paleobotany, Plant ecology, Vegetation patterns, Paleoclimatology, Japan—Hokkaido

51-1693

Environmental changes during the late Holocene and the climatic implications of snow accumulation hollows in and around Mt. Tango, the Echigo Range, central Japan.

Takada, M., Sasaki, M., Yanagimachi, O., Ohmori, H., *Tokyo. University. Department of Geography. Bulletin,* Dec. 1990, No.22, p.35-53, 22 refs.

DLC G1.T64a

Snow cover effect, Nivation, Snow line, Soil dating, Palynology, Paleobotany, Plant ecology, Vegetation patterns, Climatic changes, Paleoclimatology, Japan

51-1694

Cooling of Hokkaido around 9000 BP caused by permafrost meltwater burst.

Sakaguchi, Y., *Tokyo. University. Department of Geography. Bulletin,* Dec. 1992, No.24, p.1-6, 17 refs.

DLC G1.T64a

Permafrost beneath rivers, Permafrost hydrology, Ground thawing, Meltwater, Paleoclimatology, Russia—Amur River, Japan—Hokkaido

51-1695

Responses of drainage basins to the Pleistocene-Holocene climatic change: Japan and other mid-latitude regions.

Oguchi, T., *Tokyo. University. Department of Geography. Bulletin,* Dec. 1992, No.24, p.51-73, Refs. p.69-73.

DLC G1.T64a

River basins, Water erosion, Sediment transport, Paleobotany, Vegetation patterns, Vegetation factors, Periglacial processes, Slope processes, Climatic changes

51-1696

Methane as a paleoindicator of the dynamics of permafrost deposits.

Rivkina, E.M., Gilichinskiĭ, D.A., *Lithology and mineral resources,* July-Aug. 1996, 31(4), p.396-399, Translated from Litologiia i poleznye iskopaemye, Vol.31, No.4, 1996, p.445-448. 9 refs.

Permafrost indicators, Frozen ground chemistry, Tundra climate, Tundra soils, Soil composition, Soil microbiology, Paleoclimatology, Global warming

51-1697

Improvement of blower type snow fences by control of the shear layer.

Haniu, H., Sakamoto, H., Takai, K., *Journal of natural disaster science,* 1995, 17(1), p.53-64, 2 refs.

Snow fences, Blowing snow, Snowdrifts, Visibility, Road maintenance

51-1698

Climatic changes in central Japan since 38,400 yBP—viewed from palynological study on Ozegahara deposits.

Sakaguchi, Y., *Tokyo. University. Department of Geography. Bulletin,* Mar. 1978, No.10, p.1-10, 18 refs.

DLC G1.T64a

Peat, Soil dating, Soil profiles, Palynology, Paleobotany, Snowfall, Paleoclimatology, Japan

51-1699

Distribution and genesis of Japanese peatlands.

Sakaguchi, Y., *Tokyo. University. Department of Geography. Bulletin,* Mar. 1979, No.11, p.17-42, 37 refs.

DLC G1.T64a

Peat, Soil surveys, Soil mapping, Soil formation, Soil profiles, Soil dating, Soil classification, Paludification, Swamps, Floodplains, Japan

51-1700

Statistical approach to asymmetry in roughness of mountain slopes in Japan from the viewpoint of climatic geomorphology.

Ohmori, H., *Tokyo. University. Department of Geography. Bulletin,* Mar. 1979, No.11, p.77-92, 56 refs.

DLC G1.T64a

Alpine glaciation, Periglacial processes, Slope processes, Slope orientation, Insolation, Mass movements (geology), Geomorphology, Surface roughness, Statistical analysis, Japan

51-1701

Geomorphology of the central Andes.

Satoh, H., *Tokyo. University. Department of Geography. Bulletin,* Dec. 1980, No.12, p.1-33, 34 refs.

DLC G1.T64a

Topographic surveys, Geological surveys, Alpine glaciation, Tectonics, Volcanoes, Geomorphology, Andes

51-1702

On the genesis of banks and hollows in peat bogs—an explanation by a thatch line theory.

Sakaguchi, Y., *Tokyo. University. Department of Geography. Bulletin,* Dec. 1980, No.12, p.35-58, 8 refs.

DLC G1.T64a

Peat, Swamps, Paludification, Snow cover effect, Nivation, Patterned ground, Geomorphology

51-1703

Climatic variability during the Holocene epoch in Japan and its causes.

Sakaguchi, Y., *Tokyo. University. Department of Geography. Bulletin,* Dec. 1982, No.14, p.1-27, 41 refs.

DLC G1.T64a

Alluvium, Soil dating, Palynology, Plant ecology, Vegetation patterns, Paleobotany, Climatic changes, Paleoclimatology, Geochronology, Floods, Volcanoes, Tectonics, Japan

51-1704

Geomorphology of the central Andes (2).

Satoh, H., *Tokyo. University. Department of Geography. Bulletin,* Dec. 1982, No.14, p.75-121, 10 refs.

DLC G1.T64a

Topographic surveys, Geological surveys, Alpine glaciation, Glacial geology, Snow line, Tectonics, Geomorphology, Geochronology, Andes

51-1705

Characteristics of Ozegahara deposits and climatic changes since Lateglacial in central Japan.

Sakaguchi, Y., *Tokyo. University. Department of Geography. Bulletin,* Mar. 1976, No.8, p.1-24, 19 refs.

DLC G1.T64a

Peat, Swamps, Floodplains, Alluvium, Soil dating, Soil profiles, Palynology, Paleobotany, Paleoclimatology, Climatic changes, Japan

51-1706

Holocene marine deposits in Hokkaido and their sedimentary environments.

Sakaguchi, Y., Kashima, K., Matsubara, A., *Tokyo. University. Department of Geography. Bulletin,* Dec. 1985, No.17, p.1-17, 20 refs.

DLC G1.T64a

Marine geology, Marine deposits, Soil dating, Drill core analysis, Fossils, Sea level, Global change, Paleoclimatology, Japan—Hokkaido

51-1707

Interglacial climates and relic Red soils in northern Japan based on pollen records of interglacial deposits in eastern Hokkaido.

Sakaguchi, Y., Okumura, K., *Tokyo. University. Department of Geography. Bulletin,* Oct. 1986, No.18, p.29-48, 51 refs.

DLC G1.T64a

Soil formation, Soil dating, Soil classification, Quaternary deposits, Drill core analysis, Palynology, Paleobotany, Geochronology, Paleoclimatology, Japan—Hokkaido

51-1708

Heat budget of the climate system between the last glacial maximum and the present.

Ohmura, A., *Tokyo. University. Department of Geography. Bulletin,* Dec. 1987, No.19, p.21-28, 17 refs.

DLC G1.T64a

Glacier melting, Ice melting, Ice heat flux, Heat balance, Paleoclimatology, Global warming

51-1709

Role of local anticyclones and cyclones on the meso-climate of Japan during the winter monsoon.

Nishina, J., *Tokyo. University. Department of Geography. Bulletin,* Dec. 1987, No.19, p.37-69, 24 refs.

DLC G1.T64a

Snowstorms, Snowfall, Marine meteorology, Marine atmospheres, Atmospheric circulation, Atmospheric disturbances, Cloud cover, Clouds (meteorology), Precipitation (meteorology), Diurnal variations, Japan

51-1710

Quaternary glaciation, its appearance and disappearance.

Sakaguchi, Y., *Tokyo. University. Department of Geography. Bulletin,* Dec. 1988, No.20, p.29-41, 43 refs.

DLC G1.T64a

Alpine glaciation, Glacier formation, Glacier melting, Glacier oscillation, Ice age theory, Global change, Paleoclimatology, Geochronology

51-1711

Some pollen records from Hokkaido and Sakhalin.

Sakaguchi, Y., *Tokyo. University. Department of Geography. Bulletin,* Dec. 1989, No.21, p.1-17, 25 refs.

DLC G1.T64a

Soil dating, Soil profiles, Drill core analysis, Palynology, Paleobotany, Vegetation patterns, Plant ecology, Paleoclimatology, Geochronology, Japan—Hokkaido, Russia—Sakhalin Island

51-1712

Warm and cold stages in the past 7600 years in Japan and their global correlation—especially on climatic impacts to the global sea level changes and the ancient Japanese history.

Sakaguchi, Y., *Tokyo. University. Department of Geography. Bulletin,* Dec. 1983, No.15, p.1-31, Refs. p.26-31.

DLC G1.T64a

Peat, Soil dating, Palynology, Paleoclimatology, Climatic changes, Global change, Sea level, Statistical analysis, Japan

51-1713

Milankovitch fluctuations in sea level and recent trends in sea-level change: ice may not always be the answer.

Jacobs, D.K., Sahagian, D.L., Sequence stratigraphy and depositional response to eustatic, tectonic and climatic forcing. Edited by B.U. Haq, Dordrecht, Kluwer Academic Publishers, 1995, p.329-366, Refs. p.359-366.

DLC QE651.S4588 1995

Sea level, Marine geology, Atmospheric circulation, Precipitation (meteorology), Global change, Paleoclimatology, Ice age theory

51-1714

Rotation of central and southern Alaska in the Early Tertiary: oroclinal bending by megakinking?

Coe, R.S., Globerman, B.R., Thrupp, G.A., NATO Advance Research Workshop on Paleomagnetic Rotations and Continental Deformation, Loutra Edipsou, Greece, May 8-13, 1988. Proceedings. Edited by C. Kissel et al and NATO Advanced Science Institutes, Series C: Mathematical and Physical Sciences. Vol.254, Dordrecht, Kluwer Academic Publishers, 1989, p.327-342, 50 refs.

DLC QE511.P335

Subpolar regions, Pleistocene, Tectonics, Earth crust, Magma, Deformation, Orientation, Geomagnetism, Magnetic anomalies, Continental drift, United States—Alaska

51-1715

Paleogeography and rotations of arctic Alaska—an unresolved problem.

Stone, D.B., NATO Advance Research Workshop on Paleomagnetic Rotations and Continental Deformation, Loutra Edipsou, Greece, May 8-13, 1988. Proceedings. Edited by C. Kissel et al and NATO Advanced Science Institutes, Series C: Mathematical and Physical Sciences. Vol.254, Dordrecht, Kluwer Academic Publishers, 1989, p.343-364, Refs. p.361-364.

DLC QE511.P335

Pleistocene, Continental drift, Subpolar regions, Earth crust, Orientation, Deformation, Tectonics, Geomagnetism, Boreholes, Drill core analysis, United States—Alaska

51-1716

Siliceous microfossil succession in the recent history of two basins in Lake Baikal, Siberia.

Edlund, M.B., Stoermer, E.F., Pilskaln, C.H., *Journal of paleolimnology,* Sep. 1995, 14(2), p.165-184, 53 refs.

Limnology, Paleoecology, Lacustrine deposits, Plankton, Ecosystems, Coring, Biomass, Statistical analysis, Classifications, Climatic changes, Russia—Baykal, Lake

51-1717

Vacuum sampler for subsampling freeze-dried laminated sediments with the application to *in situ* frozen varves of Mondsee, Austria.

Schmidt, R., Höllerer, H., Wallner, G., *Journal of paleolimnology,* July 1995, 14(1), p.93-96, 11 refs.

Limnology, Lacustrine deposits, Core samplers, Frozen ground mechanics, Freeze drying, Vacuum freezing, Radioactive age determination, Design, Performance

51-1718

Ostracode carbonate $\delta^{18}O$- and $\delta^{13}C$-signatures of hydrological and climatic changes affecting Lake Neuchâtel, Switzerland, since the latest Pleistocene.

Schwalb, A., Lister, G.S., Kelts, K., *Journal of paleolimnology,* 1994, 11(1), p.3-17, 47 refs.

Pleistocene, Paleoclimatology, Limnology, Paleoecology, Lacustrine deposits, Geochronology, Stratigraphy, River flow, Isotope analysis, Geochemical cycles, Hydrology, Switzerland—Neuchâtel, Lake

51-1719

Deformation and mass transport in the Nordre Strømfjord shear zone, central West Greenland.

Sørensen, K., Winter, J.D., NATO Advanced Research Workshop on Fluid Movements, Lindås, Norway, May 18-24, 1987. Proceedings. Element transport and the composition of the deep crust. Edited by D. Bridgwater and NATO Advanced Science Institute, Series C. Mathematical and Physical Sciences. Vol.281, Dordrecht, Kluwer Academic Publishers, 1989, p.171-185, 24 refs.

DLC QE511.F625

Tectonics, Geological surveys, Earth crust, Magma, Shear stress, Shear strain, Profiles, Sampling, Geochemistry, Fluid dynamics, Deformation, Greenland—Nordre Strømfjord

51-1720

Testing and analysis of terra cotta glaze repairs.

Viera, R.J., International Symposium on Standards for Preservation and Rehabilitation, Dallas, TX, Oct. 11-12, 1993. and American Society for Testing and Materials. Special technical publication 1258, Ann Arbor, Mar. 1996, p.319-336, 10 refs.

DLC TH3411.S72

Ceramics, Buildings, Preserving, Protective coatings, Polymers, Degradation, Frost resistance, Freeze thaw tests, Freeze thaw cycles, Maintenance, Weathering, Standards

51-1721

Studies of water adsorbed in porous vycor glass.

Hirama, Y., Takahashi, T., Hino, M., Sato, T., *Journal of colloid and interface science,* Dec. 25, 1996, 184(2), p.349-359, 46 refs.

Ice solid interface, Ice water interface, Ice physics, Porous materials, Adsorption, Capillarity, Freezing points, Melting points, Nuclear magnetic resonance, Temperature effects, Phase transformations, Surface properties

51-1722

Boundary-layer modification in wintertime cold-air outbreaks from the arctic sea ice.

Brümmer, B., *Boundary-layer meteorology,* July 1996, 80(1-2), p.109-125, 28 refs.

Synoptic meteorology, Marine atmospheres, Polar atmospheres, Atmospheric boundary layer, Profiles, Wind velocity, Air ice water interaction, Ice cover effect, Air flow, Ice heat flux, Stability, Modification, Aerial surveys, Arctic Ocean

51-1723

Evidence of water conservation mechanisms in several subarctic wetland species.

Blanken, P.D., Rouse, W.R., *Journal of applied ecology,* Aug. 1996, 33(4), p.842-850, 38 refs.

Wetlands, Subarctic landscapes, Continuous permafrost, Plant ecology, Transpiration, Roots, Trees (plants), Plant physiology, Water content, Water balance, Meteorological factors, Sampling

51-1724

Chemical weathering of basalt in southwest Iceland: effects of runoff, age of rocks and vegetative/glacial cover.

Gíslason, S.R., Arnórsson, S., Ármannsson, H., *American journal of science,* Oct. 1996, 296(8), p.837-907, Refs. p.899-907.

Subarctic landscapes, Lithology, Magma, River basins, Surface drainage, Runoff, Hydrogeochemistry, Weathering, Glacial geology, Solubility, Sediment transport, Vegetation factors, Sampling, Iceland

51-1725

Anomalous state of ice.

Lo, S.Y., *Modern physics letters B,* Aug. 20, 1996, 10(19), p.909-919, 4 refs.

Ice physics, Ice structure, Molecular structure, Phase transformations, Ion diffusion, Ion density (concentration), Scanning electron microscopy, Ice optics, Ultraviolet radiation, Photochemical reactions, Polarization (charge separation)

51-1726

Permafrost aggradation and peat accumulation since 1200 years B.P. in peat plateaus at Tuchitua, Yukon Territory (Canada).

Harris, S.A., Schmidt, I.H., *Journal of paleolimnology,* 1994, 12(1), p.3-17, 42 refs.

Subarctic landscapes, Wetlands, Peat, Frozen ground mechanics, Permafrost transformation, Permafrost thermal properties, Frost mounds, Drill core analysis, Frost penetration, Thermal regime, Periodic variations, Canada—Yukon Territory—Tuchitua

51-1727

Diatom responses to late Quaternary vegetation and climate change, and to deposition of two tephras in an alpine and a sub-alpine lake in Yoho National Park, British Columbia.

Hickman, M., Reasoner, M.A., *Journal of paleolimnology,* 1994, 11(2), p.173-188, 78 refs.

Paleoecology, Paleoclimatology, Alpine landscapes, Paleobotany, Limnology, Palynology, Stratigraphy, Classifications, Lacustrine deposits, Quaternary deposits, Magma, Geochemical cycles, Algae, Canada—British Columbia—Yoho National Park

51-1728

Frost hardiness of Norway spruce grown under elevated atmospheric CO_2 and increased nitrogen fertilizing.

Wiemken, V., Kossatz, L., Ineichen, K., *Journal of plant physiology,* Aug. 1996, 149(3-4), p.433-438, 20 refs.

Plant physiology, Trees (plants), Plant tissues, Ion diffusion, Carbon dioxide, Nutrient cycle, Frost resistance, Cold tolerance, Cold weather tests, Temperature effects

51-1729

Interrelationships between ultrastructure, sugar levels, and frost hardiness of ray parenchyma cells during frost acclimation and deacclimation in poplar (*Populus x canadensis* Moench <*robusta*>) wood.

Sauter, J.J., Wisniewski, M., Witt, W., *Journal of plant physiology,* Aug. 1996, 149(3-4), p.451-461, 49 refs.

Plant physiology, Trees (plants), Plant tissues, Frost resistance, Cold stress, Acclimatization, Temperature effects, Cold weather tests, Microstructure, Scanning electron microscopy, Desiccation, Chemical analysis

51-1730

Russian Arctic ice atlas. Volume II—Kara Sea.

CANATEC Consultants Ltd., Calgary, Nov. 1991, 85p. + maps, 2 refs.

Oceanography, Sea ice distribution, Ice surveys, Ice cover thickness, Statistical analysis, Mapping, Maps, Seasonal variations, Russia—Kara Sea

51-1731

Antarctic no match for Ivan the Terra Bus.

Brezonick, M., *Diesel progress engines and drives,* May 1996, 62(5), p.10-11.

Vehicles, Diesel engines, Transportation, Cold weather operation, Antarctica—McMurdo Station

This vehicle is designed to operate successfully in the severe climate at McMurdo Station and its surroundings. It is equipped with special heating systems for its engine and transmission and its passengers, to provide reliable, safe, and continuous transport in the McMurdo complex.

51-1732

Detailed PSC formation in a two-dimensional chemical transport model of the stratosphere.

Fonteyn, D., Larsen, N., *Annales geophysicae,* Mar. 1996, 14(3), p.315-328, 48 refs.

Stratosphere, Models, Cloud physics, Atmospheric composition, Polar regions

A new two-dimensional zonal model of the stratosphere, based on a formulation in an isentropic framework, with complete chemistry has been coupled with a high resolution detailed microphysical model for polar stratospheric clouds (PSCs). The 2D model chemistry includes all presently known heterogeneous processes on sulfate aerosols and PSCs. The coupling of these two models, with inherently different time scales, is discussed. It is demonstrated that in order to obtain a realistic interrelationship between NO_y and N_2O an accurate simulation of the sedimentation by PSC particles is necessary. A good agreement of model PSC presence and observations is found for the antarctic polar winter without the need to impose additional artificial temperature variations in the model. The calculated occurrence of polar stratospheric clouds and resulting heterogeneous chemistry during the antarctic winter are discussed. Sensitivity of the polar stratopheric chemical composition and cloud formation for different perturbations is investigated by studying the effects of transport across the polar vortex boundary and heterogeneous processing by an enhanced sulfate aerosol load. The importance of including sedimentation for all cases is also discussed. (Auth.)

51-1733

Operational demonstration of ERS-1 SAR imagery at the Joint Ice Center.

Wohl, G.M., Bertoia, C.A., MTS '92, Washington, D.C., Oct. 19-21, 1992. Proceedings. Global ocean partnership. Vol.2, Washington, D.C., Marine Technology Society, 1992, p.429-433, 4 refs.

DLC GC2.M78 1992

Sea ice distribution, Ice navigation, Spaceborne photography, Image processing, Ice conditions, Antarctica—Ross Sea

The Navy/NOAA Joint Ice Center (JIC) was organized in 1976 to bring together Navy and NOAA resources for the analysis and forecasting of sea ice conditions on a global basis. The JIC is tasked with providing sea ice support to government, private and foreign users. Routine products include weekly sea ice analyses for the Arctic and Antarctic, thrice weekly analyses for the Alaskan and Great Lakes regions, 7 day and 30 day forecasts for the Arctic and seasonal outlooks for the Alaskan North Slope, Baffin Bay and western Ross Sea regions. Algorithm results are discussed with particular attention to future SAR applications to global sea ice analysis in the RADARSAT timeframe. (Auth. mod.)

51-1734

***Nathaniel B. Palmer*, new NSF antarctic icebreaker.**

Sutherland, A.L., MTS '92, Washington, D.C., Oct. 19-21, 1992. Proceedings. Global ocean partnership. Vol.2, Washington, D.C., Marine Technology Society, 1992, p.861-865, 4 refs.

DLC GC2.M78 1992

Icebreakers, Ice navigation, Laboratories, Cold weather performance, Equipment, Oceanographic ships

The 308-foot, 6,800-ton, ABS A2, research vessel-icebreaker, *Nathaniel B. Palmer,* was commissioned on Mar. 13, 1992. The ship immediately proceeded to the antarctic ocean and has been working in ice covered waters since that time. This paper provides a brief review of the *Nathaniel B. Palmer,* its technical specifications, the suite of scientific outfitting aboard the vessel and an assessment of the performance of the vessel during the first months of operation. (Auth.)

51-1735

Science features of the new U.S. antarctic research vessel with icebreaking capability: *Nathaniel B. Palmer.*

Kennedy, H., Sutherland, A., Voelker, R., St. John, J., MTS '91, New Orleans, LA, Nov. 10-14, 1991. Proceedings. An ocean cooperative: industry, government and academia. Vol.1, Washington, D.C., Marine Technology Society, 1991, p.19-25, 5 refs.

DLC GC2.M78 1991

Ice navigation, Icebreakers, Oceanographic ships, Laboratories, Engines, Electronic equipment, Sea ice, Instruments

This paper describes the new U.S. antarctic research vessel *Nathaniel B. Palmer* that was designed and built to provide the nation with a year-round capability in the south polar region. The vessel's annual operating profile, performance requirements, the acquisition process, and the scientific suite are described. The procedure for scientists and engineers to perform research aboard the vessel are provided in the concluding remarks. (Auth.)

51-1736

Słupia upper floodplain in the vicinity of Słupsk, Pomerania, Poland.

Alexandrowicz, S.W., Florek, W., Zaborowska, K., Zachowicz, J., *Quaestiones geographicae,* 1985/1986 (Pub. 1990), No.11/12, p.5-27 + 2 fold. graphs, 38 refs.

DLC G1.Q3

Floodplains, Outwash, Alluvium, Eolian soils, Quaternary deposits, Soil dating, Soil profiles, Paleoecology, Paleoclimatology, Geomorphology, Poland

51-1737

Annual precipitation dynamics in Poznań and Kharkov.

Babicz, A.D., Dubinski, G.P., Tamulewicz, J., *Quaestiones geographicae,* 1985/1986 (Pub. 1990), No.11/12, p.29-38 + 1 fold. graph, 8 refs.

DLC G1.Q3

Precipitation (meteorology), Snowfall, Meteorological data, Statistical analysis, Poland, Ukraine

51-1738

Photointerpretation of geometry of Vistulian ice-wedge polygons: the Grabianowo and the Sulejewo sites, south of Poznań.

Bogdański, P., Kijowski, A., *Quaestiones geographicae,* 1985/1986 (Pub. 1990), No.11/12, p.39-52, 43 refs.

DLC G1.Q3

Ice wedges, Fossil ice, Polygonal topography, Periglacial processes, Frost action, Permafrost indicators, Moraines, Paleoclimatology, Photointerpretation, Terrain identification, Poland

51-1739

Effect of bedrock and sedimentary environment on properties of glacial deposits in south Spitsbergen.

Choiński, A., Stankowska, A., Stankowski, W., *Quaestiones geographicae,* 1985/1986 (Pub. 1990), No.11/12, p.53-66 + 2 fold. graphs, 8 refs.

DLC G1.Q3

Geological surveys, Glacial geology, Glacial erosion, Glacial deposits, Glacial till, Bedrock, Marine deposits, Sediment transport, Diagenesis, Lithology, Norway—Spitsbergen

51-1740

Active layer of permafrost on the western coast of Spitsbergen.

Grześ, M., *Quaestiones geographicae,* 1985/1986 (Pub. 1990), No.11/12, p.67-79, 34 refs.

DLC G1.Q3

Permafrost surveys, Active layer, Ground thawing, Thaw depth, Air temperature, Precipitation (meteorology), Meteorological factors, Snow cover effect, Norway—Spitsbergen

51-1741

Evolution of Holocene soils in Poland.

Kowalkowski, A., *Quaestiones geographicae,* 1985/1986 (Pub. 1990), No.11/12, p.93-120 + 1 fold. graph, 60 refs.

DLC G1.Q3

Soil surveys, Soil formation, Soil classification, Soil profiles, Soil dating, Soil erosion, Soil pollution, Cryogenic soils, Frost weathering, Periglacial processes, Paleoclimatology, Poland

51-1742

Taconite Inlet Lakes Project: a systems approach to paleoclimatic reconstruction.

Bradley, R.S., et al, *Journal of paleolimnology,* Sep. 1996, 16(2), p.97-110, 43 refs.

Paleoclimatology, Limnology, Lacustrine deposits, Sedimentation, Arctic landscapes, Watersheds, Snowmelt, Sea water, Isostasy, Research projects, Canada—Northwest Territories—Ellesmere Island

51-1743

Comparative limnology of high arctic, coastal, meromictic lakes.

Ludlam, S.D., *Journal of paleolimnology,* Sep. 1996, 16(2), p.111-131, Refs. p.129-131.

Limnology, Icebound lakes, Ice cover effect, Lake water, Turbulent diffusion, Profiles, Sounding, Aeration, Stratification, Fluid dynamics, Photosynthesis, Light effects, Radiance

51-1744

Climatic influences on streamflow and sediment flux into Lake C2, northern Ellesmere Island, Canada.

Hardy, D.R., *Journal of paleolimnology,* Sep. 1996, 16(2), p.133-149, 37 refs.

Limnology, Watersheds, Lake water, Stream flow, Hydrography, Snowmelt, Snow hydrology, Runoff, Sedimentation, Suspended sediments, Climatic factors, Seasonal variations, Canada—Northwest Territories—Ellesmere Island

51-1745

Suspended sediment transport and deposition in a high arctic meromictic lake.

Retelle, M.J., Child, J.K., *Journal of paleolimnology,* Sep. 1996, 16(2), p.151-167, 45 refs.

Limnology, Watersheds, Icebound lakes, Lacustrine deposits, Stream flow, Runoff, Sedimentation, Sediment transport, Stratification, Climatic factors, Snowmelt, Hydrography

51-1746

Recent sedimentation in a high arctic lake, northern Ellesmere Island, Canada.

Zolitschka, B., *Journal of paleolimnology,* Sep. 1996, 16(2), p.169-186, 66 refs.

Limnology, Paleoclimatology, Subpolar regions, Lacustrine deposits, Sedimentation, Stratification, Sampling, Microstructure, Lithology, Seasonal variations, Radioactive age determination, Statistical analysis, Canada—Northwest Territories—Ellesmere Island

51-1747

Changes in the importance of lotic and littoral diatoms in a high arctic lake over the last 191 years.

Ludlam, S.D., Feeney, S., Douglas, M.S.V., *Journal of paleolimnology,* Sep. 1996, 16(2), p.187-204, 58 refs.

Limnology, Subpolar regions, Ecosystems, Littoral zone, Lacustrine deposits, Algae, Classifications, Distribution, Profiles, Sampling, Coring, Sedimentation, Periodic variations, Indexes (ratios), Canada—Northwest Territories—Ellesmere Island

51-1748

Stratification patterns in Taconite Inlet, Ellesmere Island, N.W.T.

Ludlam, S.D., *Journal of paleolimnology,* Sep. 1996, 16(2), p.205-215, 24 refs.

Limnology, Subpolar regions, Estuaries, Icebound lakes, Lake water, Hydrography, Profiles, Stratification, Salinity, Ice cover effect, Canada—Northwest Territories—Ellesmere Island

51-1749

Changes in diatom assemblages in Lake C2 (Ellesmere Island, arctic Canada): response to basin isolation from the sea and to other environmental changes.

Douglas, M.S.V., Ludlam, S., Feeney, S., *Journal of paleolimnology,* Sep. 1996, 16(2), p.217-226, 37 refs.

Limnology, Icebound lakes, Subpolar regions, Plankton, Lacustrine deposits, Coring, Classifications, Water chemistry, Salinity, Stratigraphy, Statistical analysis, Canada—Northwest Territories—Ellesmere Island

51-1750

Climatic signal in varved sediments from Lake C2, northern Ellesmere Island, Canada.

Hardy, D.R., Bradley, R.S., Zolitschka, B., *Journal of paleolimnology,* Sep. 1996, 16(2), p.227-238, 15 refs.

Limnology, Subpolar regions, Icebound lakes, Lacustrine deposits, Sedimentation, Thickness, Watersheds, Stream flow, Climatic factors, Air temperature, Correlation, Periodic variations, Canada—Northwest Territories—Ellesmere Island

51-1751

Late Holocene varved sediment record of environmental change from northern Ellesmere Island, Canada.

Lamoureux, S.F., Bradley, R.S., *Journal of paleolimnology,* Sep. 1996, 16(2), p.239-255, 52 refs.

Limnology, Subpolar regions, Climatic changes, Icebound lakes, Lacustrine deposits, Sedimentation, Thickness, Coring, Radioactive age determination, Correlation, Canada—Northwest Territories—Ellesmere Island

51-1752

Parameterization of lake thermodynamics in a high-resolution weather forecasting model.

Ljungemyr, P., Gustafsson, N., Omstedt, A., *Tellus,* Oct. 1996, 48A(5), p.608-621, 26 refs.

Weather forecasting, Lake effects, Lake ice, Ice water interface, Ice cover effect, Ice cover thickness, Freezeup, Water temperature, Thermodynamics, Simulation, Mathematical models, Heat sinks, Ice forecasting

51-1753

Simulating the Baltic Sea ice season with a coupled ice-ocean model.

Haapala, J., Leppäranta, M., *Tellus,* Oct. 1996, 48A(5), p.622-643, 43 refs.

Oceanography, Climatology, Surface temperature, Sea ice distribution, Seasonal freeze thaw, Ice cover thickness, Thermodynamics, Freezeup, Degree days, Ice breakup, Simulation, Ice forecasting, Mathematical models, Baltic Sea

51-1754

Response of Baltic Sea ice to seasonal, interannual forcing and climate change.

Omstedt, A., Nyberg, L., *Tellus,* Oct. 1996, 48A(5), p.644-662, 41 refs.

Oceanography, Climatology, Climatic changes, Sea ice distribution, Air ice water interaction, Ice models, Thermodynamics, Mathematical models, Snow cover effect, Wind factors, Seasonal variations, Baltic Sea

51-1755

Changes in surface albedo and air temperature at Tartu, Estonia.

Tooming, H., *Tellus,* Oct. 1996, 48A(5), p.722-726, 18 refs.

Climatology, Radiation balance, Albedo, Snow cover effect, Air temperature, Seasonal variations, Estonia—Tartu

51-1756

Relationships between surface albedo and spring heat accumulation.

Keevallik, S., Tooming, H., *Tellus,* Oct. 1996, 48A(5), p.727-732, 9 refs.

Climatology, Atmospheric boundary layer, Heat balance, Insolation, Heating, Radiation absorption, Absorption, Albedo, Snow cover effect, Seasonal variations, Statistical analysis

51-1757

Reclamation of asphalt concretes—Swedish experience. [Återvinning av asfaltbeläggning—svenska erfarenheter]

Jacobson, T., *Sweden. Statens väg- och transportforskningsinstitutet. VTI särtryck,* 1996, No.255, 37p., In Swedish. 27 refs.

Bituminous concretes, Road maintenance, Pavements, Paving, Frost heave, Concrete admixtures, Physical properties, Stability

51-1758

Freeze-thaw durability of activated blast furnace slag cement concrete.

Gifford, P.M., Gillott, J.E., *ACI materials journal,* May-June 1996, 93(3), p.242-245, 10 refs.

Concrete admixtures, Waste disposal, Concrete curing, Concrete heating, Concrete durability, Metals, Frost resistance, Freeze thaw tests, Freeze thaw cycles, Air entrainment, Physical properties

51-1759

Microscopic study of ice propagation in concrete.

Wang, K.J., Monteiro, P.J.M., Rubinsky, B., Arav, A., *ACI materials journal,* July-Aug. 1996, 93(4), p.370-377, 11 refs.

Concrete aggregates, Concrete freezing, Degradation, Ice formation, Ice crystal structure, Ice water interface, Ion diffusion, Solidification, Supercooling, Simulation, Electron microscopy, Porosity

51-1760

Freeze-thaw durability of high-performance concrete masonry units.

Bowser, J.D., Krause, G.L., Tadros, M.K., *ACI materials journal,* July-Aug. 1996, 93(4), p.386-394, 12 refs.

Concrete durability, Concrete admixtures, Masonry, Lightweight concretes, Mortars, Frost resistance, Freeze thaw tests, Freeze thaw cycles, Cold weather tests, Physical properties, Absorption, Standards

51-1761

Ice detection on metal surfaces using the degree of polarisation of diffusely reflected light.

Demos, S.G., Alfano, R.R., *Electronics letters,* Nov. 21, 1996, 32(24), p.2254-2255, 4 refs.

Aircraft icing, Ice detection, Metals, Ice solid interface, Polarization (waves), Light scattering, Lasers, Imaging, Reflectivity, Ice optics, Ice cover effect

51-1762

Proton MAS NMR of a protein in a frozen aqueous solution.

Volke, F., Pampel, A., Haensler, M., Ullmann, G., *Chemical physics letters,* Nov. 15, 1996, 262(3-4), p.374-378, 20 refs.

Frozen liquids, Ice water interface, Solutions, Nuclear magnetic resonance, Spectra, Unfrozen water content, Liquid phases, Aggregates, Polymers

51-1763

Comparison of the microclimates of a small aspen grove and adjacent prairie in Saskatchewan.

Archibold, O.W., Ripley, E.A., Bretell, D.L., *American midland naturalist,* Oct. 1996, 136(2), p.248-261, 22 refs.

Plains, Microclimatology, Seasonal variations, Wind chill, Trees (plants), Ecosystems, Snowfall, Forest canopy, Interception, Atmospheric boundary layer, Wind factors, Topographic effects, Snow air interface, Snow cover effect

51-1764

Weathering rates as a function of flow through an alpine soil.

Clow, D.W., Drever, J.I., *Chemical geology,* Oct. 30, 1996, 132(1-4), p.131-141, 29 refs.

Alpine landscapes, Watersheds, Alpine tundra, Tundra soils, Porosity, Ground water, Seepage, Solubility, Weathering, Bedrock, Geochemistry, Ion density (concentration), Mass balance

51-1765

Global climatic changes since the last glacial maximum: evidence from paleolimnology and paleoclimate modeling.

Wright, H.E., Jr., *Journal of paleolimnology,* Mar. 1996, 15(2), p.119-127, 25 refs.

Paleoclimatology, Pleistocene, Climatic changes, Limnology, Paleoecology, Global change, Lacustrine deposits, Stratigraphy, Geochemistry, Quaternary deposits, Ice age theory, Models

51-1766

Rapid Holocene hydrologic change along boreal tree-line revealed by $\delta^{18}C$ and $\delta^{18}O$ in organic lake sediments, Northwest Territories, Canada.

Wolfe, B.B., Edwards, T.W.D., Aravena, R., MacDonald, G.M., *Journal of paleolimnology,* Mar. 1996, 15(2), p.171-181, 45 refs.

Limnology, Lacustrine deposits, Hydrology, Forest lines, Paleoecology, Forest tundra, Palynology, Stratigraphy, Isotope analysis, Geochemical cycles, Radioactive age determination, Canada—Northwest Territories

51-1767

Late Quaternary development of three ancient tarns on southwestern Cumberland Peninsula, Baffin Island, arctic Canada: paleolimnological evidence from diatoms and sediment chemistry.

Wolfe, A.P., Härtling, J.W., *Journal of paleolimnology,* Jan. 1996, 15(1), p.1-18, 67 refs.

Arctic landscapes, Limnology, Watersheds, Paleoclimatology, Paleoecology, Quaternary deposits, Sedimentation, Drill core analysis, Radioactive age determination, Water chemistry, Geochemical cycles, Canada—Northwest Territories—Baffin Island

51-1768

Diatom-based water chemistry reconstructions from northern Sweden: a comparison of reconstruction techniques.

Korsman, T., Birks, H.J.B., *Journal of paleolimnology,* Jan. 1996, 15(1), p.65-77, 33 refs.

Limnology, Lacustrine deposits, Water chemistry, Geochemistry, Paleoecology, Subarctic landscapes, Plankton, Drill core analysis, Statistical analysis, Accuracy, Sweden

51-1769

Hamilton Harbour, Ontario: 8300 years of limnological and environmental change inferred from microfossil and isotopic analyses.

Duthie, H.C., Yang, J.R., Edwards, T.W.D., Wolfe, B.B., Warner, B.G., *Journal of paleolimnology,* Jan. 1996, 15(1), p.79-97, 64 refs.

Limnology, Paleoecology, Palynology, Plankton, Lacustrine deposits, Littoral zone, Water level, Stratigraphy, Radioactive age determination, Isotope analysis, Environmental tests, Canada—Ontario—Ontario, Lake

51-1770

Coring artifacts and contaminant inventories in lake sediment.

Stephenson, M., Klaverkamp, J., Motycka, M., Baron, C., Schwartz, W., *Journal of paleolimnology,* Jan. 1996, 15(1), p.99-106, 7 refs.

Limnology, Lacustrine deposits, Core samplers, Environmental tests, Pollution, Impurities, Soil freezing, Soil water migration, Ice crystal structure, Water content, Ice water interface, Accuracy, Isotope analysis, Mass transfer

51-1771

Profiling of ponds and bogs using ground-penetrating radar.

Mellett, J.S., *Journal of paleolimnology,* Nov. 1995, 14(3), p.233-240, 12 refs.

Limnology, Ponds, Wetlands, Bottom sediment, Geophysical surveys, Radar echoes, Probes, Profiles, Stratification, Lake ice, Subglacial observations, Ice cover effect, Performance

51-1772

Late-glacial and early Holocene lake sediments, ground-water formation and climate in the Atacama Altiplano 22-24°S.

Grosjean, M., Geyh, M.A., Messerli, B., Schotterer, U., *Journal of paleolimnology,* Nov. 1995, 14(3), p.241-252, 18 refs.

Limnology, Paleoclimatology, Lacustrine deposits, Quaternary deposits, Ground water, Stratigraphy, Glacier ice, Firn, Snow composition, Sedimentation, Precipitation (meteorology), Climatic factors, Humidity, X ray diffraction, Chile—Laguna Lejia

51-1773

Post-glacial vegetation history of the Mission Mountains, Montana.

Gerloff, L.M., Hills, L.V., Osborn, G.D., *Journal of paleolimnology,* Nov. 1995, 14(3), p.269-279, 28 refs.

Alpine landscapes, Paleoclimatology, Limnology, Paleobotany, Quaternary deposits, Lacustrine deposits, Stratigraphy, Palynology, Vegetation patterns, Correlation, United States—Montana—Mission Mountains

51-1774

Ostracode $\delta^{18}O$ and $\delta^{13}C$ evidence of Holocene environmental changes in the sediments of two Minnesota lakes.

Schwalb, A., Locke, S.M., Dean, W.E., *Journal of paleolimnology,* Nov. 1995, 14(3), p.281-296, 46 refs.

Limnology, Climatic changes, Precipitation (meteorology), Quaternary deposits, Paleoecology, Lacustrine deposits, Sampling, Isotope analysis, Radioactive age determination, Geochemistry, Water level, United States—Minnesota

51-1775

Late-glacial paleoenvironment of Lake Algonquin sediments near Clarksburg, Ontario.

Karrow, P.F., Anderson, T.W., Delorme, L.D., Miller, B.B., Chapman, L.J., *Journal of paleolimnology,* Nov. 1995, 14(3), p.297-309, 47 refs.

Pleistocene, Paleoclimatology, Limnology, Glacial lakes, Water level, Littoral zone, Quaternary deposits, Lacustrine deposits, Paleoecology, Stratigraphy, Radioactive age determination, Canada—Ontario—Clarksburg

51-1776

Coastal Massachusetts pond development: edaphic, climatic, and sea level impacts since deglaciation.

Winkler, M.G., Sanford, P.R., *Journal of paleolimnology,* Nov. 1995, 14(3), p.311-336, 63 refs.

Paleoecology, Paleoclimatology, Lacustrine deposits, Clay soils, Ponds, Moraines, Outwash, Geomorphology, Sea level, Shoreline modification, Ground ice, Stratigraphy, Radioactive age determination, United States—Massachusetts

51-1777

Environment 2: a new town for science.

U.S. National Science Foundation/American Institute of Architecture. Student Monograph Competition, Washington, D.C., May 1993, 83p., Refs. passim. For selected papers see 51-1778 through 51-1781 or G-56395 through G-56397 and H-56398.

Cold weather construction, Design, Logistics, Urban planning, Human factors engineering, Environmental protection, Stations, Antarctica—McMurdo Station

In conjunction with a comprehensive, graphically illustrated design competition, the American Institute of Architecture Students (AIAS) and the National Science Foundation (NSF) invited all students enrolled in U.S. colleges and universities to submit a specialized research paper to be published in this monograph collection, *Environment 2: A new town for science,* on the design of antarctic habitats. Papers were judged in the categories of community planning, habitat construction, infrastructure and power systems, environmental factors, and human behavioral factors. This collection includes 5 winning papers which are preceded by an adaptation from remarks made to an Environment 2 planning meeting by Dr. Peter E. Wilkniss, NSF Director, Division of Polar Programs.

51-1778

Design paradigms and the functional adaptation model: a theoretical basis to examine heterogeneous environmental design approaches for McMurdo Station, Antarctica—A new town for science.

Burley, J.B., U.S. National Science Foundation/American Institute of Architecture Students. Student monograph competition. Environment 2: a new town for science, Washington, D.C., May 1993, p.5-19, 30 refs.

Cold weather construction, Design, Logistics, Urban planning, Human factors engineering, Environmental protection, Stations, Antarctica—McMurdo Station

This paper examines discrete design paradigms applicable to the creation of "a new town for science," at McMurdo Station and suggests that the design of a new town for science may combine a set of design paradigms imbedded within each other to create a city that has meaning at a variety of distinct intellectual levels. (Auth. mod.)

51-1779

Bioclimate energy dynamics at McMurdo Station, Antarctica.

Burley, J.B., U.S. National Science Foundation/American Institute of Architecture Students. Student monograph competition. Environment 2: a new town for science, Washington, D.C., May 1993, p.31-39 + appends., 2 refs.

Cold weather construction, Design, Heat loss, Solar radiation, Human factors engineering, Landscape development, Buildings, Thermal insulation, Wind factors, Antarctica—McMurdo Station

This paper examines the potential for glazing to be employed as a passive solar radiant energy inlet. The study determined that during the summer months, the energy levels passing through a 10 x 10 foot window, with three panes, each $\frac{1}{4}$ in. thick facing north for a building maintained at 60°F results in a substantial gain for the structure and a substantial loss during the winter, requiring blockage and further insulation during the winter months. In addition, the study determined that reduction of wind flux around the structures can further reduce energy loss. (Auth.)

51-1780

Environmental spatial modeling for McMurdo Station, Antarctica: a geographic information systems analysis and application.

Burley, J.B., U.S. National Science Foundation/American Institute of Architecture Students. Student monograph competition. Environment 2: a new town for science, Washington, D.C., May 1993, p.57-76, 34 refs.

Cold weather construction, Geography, Mathematical models, Site surveys, Urban planning, Landscape development, Design, Environmental protection, Computer applications, Stations, Antarctica—McMurdo Station

This paper presents an overview of geographic information systems technology applicable for site development of McMurdo Station. With the development of micro-computer technology, enabling rapid calculation of spatial algorithms, geographical information systems (GIS) are presently in an enhanced position to conduct investigations which explore the spatial conditions for the development of new towns. This process has been labeled "mapematics." The results can be presented in a two-dimensional format, printed output, and in film format for public consumption. The results of this study indicate that there are two major bands of land at the station that are most suitable for development; a substantial portion is less suitable due to steep slopes, proximity to shorelines, permanent snow/ice fields, historic sites, aspect, and distance from loading docks. (Auth. mod.)

51-1781

Stress as an obstacle to normal function.

Courington, R., U.S. National Science Foundation/American Institute of Architecture Students. Student monograph competition. Environment 2: a new town for science, Washington, D.C., May 1993, p.77-83, 9 refs.

Cold weather construction, Design, Logistics, Urban planning, Human factors engineering, Acclimatization, Physiological effects, Low temperature research, Antarctica—McMurdo Station

This paper addresses fundamental problems related to the ability of man to function normally in the intensely alien environment of Antarctica. An alien environment pushes the adaptive capacity to, and even past, its limits. Adaptation is a function of a partnership between two physical systems, the neurological system and the endocrine system. This combined system, the neuroendocrine system, enables us to adapt to small changes in the environment, and has a close relationship with the immune system. The most important factors influencing the neuroendocrine system are discussed; light, smell, sound, visual vistas, group size, community organization, privacy, recreation, wind, plants, and pets. (Auth. mod.)

51-1782

Ozone depletion observed by rocket measurements and ground-based observations during the large solar proton events.

Raspopov, O.M., et al, *COSPAR Colloquia Series,* 1994, Vol.5, STEP Symposium/5th COSPAR Colloquium, Laurel, MD, Aug. 24-28, 1992. Solar-Terrestrial Energy Program: the initial results from STEP facilities and theory campaigns. Proceedings. Edited by D.N. Baker, V.O. Papitashvili and M.J. Teague, p.497-500, 3 refs.

DLC QC811.S7 1992

Solar activity, Protons, Geomagnetism, Ozone, Atmospheric composition, —Indian Ocean

During significant solar proton events (SPE), which occurred in Oct. of 1989 and were accompanied by pronounced magnetic storms, instruments on rockets launched from a Soviet research vessel in the southern portion of the Indian Ocean, in the auroral zone, recorded a marked reduction of ozone and a great increase of nitric oxide in the middle atmosphere. The ozone depletion and the NO density increase were observed at an altitude of about 45-55 km. It is concluded that results suggest a strong influence of nitric cycle reactions on the ozone depletion in the middle atmosphere during SPE.

51-1783

Snow flats on ice plates covering frozen inland lakes in winter (Germany).

Mader, D., Aeolian and adhesion morphodynamics and phytoecology in recent coastal and inland sand and snow flats and dunes from mainly North Sea and Baltic Sea to Mars and Venus. Vol.2, Chapter 4. Monograph by D. Mader, Frankfurt am Main, Peter Lang GmbH Europäischer Verlag der Wissenschaften, 1995, p.1233-1262, Refs. passim.

DLC GB632.M27 1995

Frozen lakes, Lake ice, Snow ice interface, Snow accumulation, Snow surface, Snow air interface, Snowdrifts, Snow erosion, Wind erosion, Sediment transport, Germany

51-1784

Mars, Venus, Titan, Triton and other bodies in the solar system of planets and satellites.

Mader, D., Aeolian and adhesion morphodynamics and phytoecology in recent coastal and inland sand and snow flats and dunes from mainly North Sea and Baltic Sea to Mars and Venus. Vol.2, Chapter 7. Monograph by D. Mader, Frankfurt am Main, Peter Lang GmbH Europäischer Verlag der Wissenschaften, 1995, p.1587-1765, Refs. passim.

DLC GB632.M27 1995

Mars (planet), Satellites (natural), Planetary environments, Extraterrestrial ice, Ice composition, Ice sublimation, Wind erosion, Eolian soils

51-1785

Reproductive ecology of *Dryas integrifolia* in the high Arctic semi-desert.

Krannitz, P.G., *Canadian journal of botany,* Sep. 1996, 74(9), p.1451-1460, With French summary. 34 refs.

Phenology, Plants (botany), Arctic landscapes, Deserts, Ecosystems, Plant ecology, Insolation, Growth, Dispersions, Cold weather survival, Canada—Northwest Territories—Igloolik

51-1786

Comparison of the foliar nutrient status of elfinwood and symmetrically formed tall trees, Colorado Front Range, U.S.A.

Barrick, K.A., Schoettle, A.W., *Canadian journal of botany,* Sep. 1996, 74(9), p.1461-1475, With French summary. Refs. p.1473-1475.

Forest ecosystems, Plant ecology, Trees (plants), Tundra vegetation, Alpine landscapes, Forest lines, Nutrient cycle, Plant tissues, Wind factors, Stresses, Cold weather survival, Sampling, Statistical analysis, Microclimatology, United States—Colorado—Front Range

51-1787

Mycorrhizal chronosequence near Exit Glacier, Alaska.

Helm, D.J., Allen, E.B., Trappe, J.M., *Canadian journal of botany,* Sep. 1996, 74(9), p.1496-1506, With French summary. 44 refs.

Ecosystems, Subarctic landscapes, Fungi, Revegetation, Vegetation patterns, Glacier melting, Outwash, Glacier beds, Ice edge, Sampling, United States—Alaska—Exit Glacier

51-1788

Environmental filters and seedling recruitment on a coastal dune in subarctic Quebec (Canada).

Houle, G., *Canadian journal of botany,* Sep. 1996, 74(9), p.1507-1513, With French summary. 35 refs.

Plant ecology, Subarctic landscapes, Shores, Grasses, Growth, Dispersions, Vegetation patterns, Revegetation, Canada—Quebec—Whapmagoostui-Kuujjuaraapik

51-1789

Laurentide subglacial outburst floods: landform evidence from digital elevation models.

Shaw, J., Rains, B., Eyton, R., Weissling, L., *Canadian journal of earth sciences,* Aug. 1996, 33(8), p.1154-1168, With French summary. 59 refs.

Pleistocene, Glacial hydrology, Flooding, Meltwater, Landforms, Geomorphology, Water erosion, Subglacial drainage, Computerized simulation, Topographic features

51-1790

Frost resistance of high-performance concrete. [La résistance au gel des bétons à haute performance]

Marchand, J., Gagné, R., Jacobsen, S., Pigeon, M., Sellevold, E.J., *Canadian journal of civil engineering,* Oct. 1996, 23(5), p.1070-1080, In French with English summary. 62 refs. For another version see 50-2640.

Concrete durability, Frost resistance, Microstructure, Porosity, Air entrainment, Cracking (fracturing), Physical properties, Ice formation, Degradation, Standards

51-1791

Thermal impact of artificial circulation on an ice-covered mid-latitude lake.

Rogers, C.K., Lawrence, G.A., Hamblin, P.F., *Canadian journal of civil engineering,* Oct. 1996, 23(5), p.1081-1091, With French summary. 17 refs.

Lake ice, Water temperature, Ice formation, Ice forecasting, Heat transfer, Air ice water interaction, Polynyas, Ice cover effect, Ice heat flux, Water transport, Aeration, Hydraulic jets, Simulation, Turbulent exchange, Ice control

51-1792

Combined wave-iceberg loading on offshore structures.

Foschi, R., Isaacson, M., Allyn, N., Yee, S., *Canadian journal of civil engineering,* Oct. 1996, 23(5), p.1099-1110, With French summary. 25 refs.

Offshore structures, Ice loads, Loads (forces), Icebergs, Water waves, Ice water interface, Ice solid interface, Impact strength, Standards, Design criteria, Hydrodynamics, Mathematical models, Statistical analysis

51-1793

Facies analysis of a pumiceous terrace beside Klutlan Glacier, Yukon Territory.

Donaldson, J.A., Guerstein, P.G., Mueller, W., *Canadian journal of earth sciences,* Sep. 1996, 33(9), p.1233-1242, With French summary. 29 refs.

Glacial hydrology, Glacial geology, Terraces, Ice edge, Magma, Sedimentation, Meltwater, Stratigraphy, Sealing, Ice cover effect, Canada—Yukon Territory—Klutlan Glacier

51-1794

Large-scale spatial trends in recent firn chemistry along an east-west transect through central Greenland.

Fischer, H., Wagenbach, D., *Atmospheric environment,* Oct. 1996, 30(19), p.3227-3238, 37 refs.

Ice sheets, Glacial meteorology, Ice cores, Drill core analysis, Firn stratification, Snow accumulation, Snow composition, Aerosols, Impurities, Snow air interface, Ion density (concentration), Distribution, Seasonal variations, Greenland

51-1795

Late Quaternary evolution of a lunette in the central Great Plains: Wilson Ridge, Kansas.

Arbogast, A.F., *Physical geography,* July-Aug. 1996, 17(4), p.354-370, Refs. p.366-370.

Pleistocene, Paleoclimatology, Climatic changes, Plains, Quaternary deposits, Landforms, Landscape development, Geomorphology, Eolian soils, Stratigraphy, Sedimentation, Soil formation, Radioactive age determination, United States—Kansas

51-1796

Three-dimensional observations of a deep convective chimney in the Greenland Sea during winter 1988/89.

Morawitz, W.M.L., Sutton, P.J., Worcester, P.F., Cornuelle, B.D., Lynch, J.F., Pawlowicz, R., *Journal of physical oceanography,* Nov. 1996, 26(11), p.2316-2343, 62 refs.

Oceanography, Ocean currents, Subpolar regions, Convection, Ventilation, Sea ice distribution, Ice cover effect, Ice water interface, Hydrography, Temperature measurement, Water temperature, Temperature inversions, Isotherms, Greenland Sea

51-1797

Sea ice ridging schemes.

Gray, J.M.N.T., Killworth, P.D., *Journal of physical oceanography,* Nov. 1996, 26(11), p.2420-2428, 17 refs.

Oceanography, Sea ice distribution, Pressure ridges, Advection, Ice cover thickness, Air ice water interaction, Shear strain, Ice models, Mathematical models

51-1798

Origin of metacarbonate rocks in the Archaean Isua supracrustal belt, West Greenland.

Rose, N.M., Rosing, M.T., Bridgwater, D., *American journal of science,* Nov. 1996, 296(9), p.1004-1044, 36 refs.

Subpolar regions, Earth crust, Tectonics, Geologic processes, Magma, Fluid dynamics, Lithology, Stratigraphy, Greenland

51-1799

Geophysical logging characteristics of the geologic section of cryo-litho-hydrate zones of West Siberia.

Agalakov, S.E., Nenakhov, V.A., *Petroleum geology,* 1996, 30(4), p.341-345, Translated from Resursy netraditsionnogo gazovogo syr'ia i problemy ego osvoeniia, Leningrad, 1990.

Natural gas, Natural resources, Exploration, Radioactive logging, Hydrates, Economic development, Permafrost structure, Permafrost surveys, Geophysical surveys, Geocryology, Russia—Siberia

51-1800

Periglacial slope deposits and soil formation of the Bavarian forest border—towards a geogenic foundation for landscape ecosystems research in the seminatural sector of a forest area. [Periglaziale Deckschichten und Böden im Bayerischen Wald und seinen Randgebieten—als geogene Grundlagen landschaftsökolgischer Forschung im Bereich naturnaher Waldstandorte]

Völkel, J., *Zeitschrift für Geomorphologie,* 1995, No.96 (suppl.), 301p., In German with English summary. Refs. p.177-190.

Ecosystems, Pleistocene, Vegetation patterns, Periglacial processes, Slope processes, Sedimentation, Forest soils, Soil formation, Soil profiles, Landscape development, Geomorphology, Models, Stratification, Classifications, Germany—Bavaria

51-1801

Climatic and ecological controls on ice segregation and thermokarst: the case history of a permafrost plateau in northern Quebec.

Allard, M., Caron, S., Bégin, Y., *Permafrost and periglacial processes,* Sep. 1996, 7(3), p.207-227, With French summary. 44 refs.

Permafrost transformation, Permafrost distribution, Thermokarst development, Landscape development, Permafrost thermal properties, Thermal regime, Stratification, Discontinuous permafrost, Frost mounds, Geocryology, Canada—Quebec

51-1802

Cryptogamic soil buds in the equatorial Andes of Venezuela.

Pérez, F.L., *Permafrost and periglacial processes,* Sep. 1996, 7(3), p.229-255, With French summary. Refs. p.251-255.

Mountain soils, Organic soils, Periglacial processes, Geocryology, Ice needles, Frost heave, Sorting, Particle size distribution, Soil texture, Microrelief, Patterned ground, Venezuela—Andes

51-1803

^{14}C dating of trapped gases in massive ground ice, western Canadian Arctic.

Moorman, B.J., Michel, F.A., Wilson, A., *Permafrost and periglacial processes,* Sep. 1996, 7(3), p.257-266, With French summary. 30 refs.

Geocryology, Ground ice, Permafrost dating, Frozen ground chemistry, Ice dating, Carbon isotopes, Radioactive age determination, Ice cores, Ice sublimation, Bubbles, Gas inclusions, Canada—Northwest Territories

51-1804

Modelling and verification of the permafrost distribution in the Bernese Alps (western Switzerland).

Imhof, M., *Permafrost and periglacial processes,* Sep. 1996, 7(3), p.267-280, With French summary. 28 refs.

Alpine landscapes, Permafrost distribution, Permafrost surveys, Topographic surveys, Mapping, Rock glaciers, Permafrost indicators, Permafrost origin, Forecasting, Simulation, Lithology, Periglacial processes, Switzerland—Alps

51-1805

Radiocarbon dating by high-sensitivity liquid scintillation counting of wood from the Fox permafrost tunnel near Fairbanks, Alaska.

Long, A., Péwé, T.L., *Permafrost and periglacial processes,* Sep. 1996, 7(3), p.281-285, With French summary. 12 refs.

Permafrost dating, Sediments, Gravel, Quaternary deposits, Wood, Permafrost structure, Continuous permafrost, Radioactive age determination, Isotope analysis, Tunnels, Scintillation, Stratigraphy, United States—Alaska—Fairbanks

51-1806

Results of chemical testing for various types of water and ice, Yamal Peninsula, Russia.

Leibman, M.O., *Permafrost and periglacial processes,* Sep. 1996, 7(3), p.287-296, With French summary. 13 refs.

Geocryology, Ground ice, Continuous permafrost, Sampling, Ice composition, Chemical properties, Frozen ground chemistry, Pingos, Boreholes, Stratigraphy, Ion density (concentration), Origin, Russia—Yamal Peninsula

51-1807

Monitoring the evolution of permafrost in the Tien Shan.

Gorbunov, A.P., *Permafrost and periglacial processes,* Sep. 1996, 7(3), p.297-298, With French summary. 2 refs.

Permafrost distribution, Permafrost indicators, Alpine landscapes, Permafrost origin, Climatic factors, Kazakhstan—Tien Shan

51-1808

Low-temperature properties of blends of synthetic oils.

Petrova, L.N., Sazonova, N.S., Matveeva, O.I., Molchanova, E.IU., Podvigina, O.A., *Chemistry and technology of fuels and oils,* Sep. 1996, 32(1), p.41-43, Translated from Khimiia i tekhnologiia topliv i masel. 3 refs.

Crude oil, Lubricants, Frozen liquids, Hydrocarbons, Low temperature tests, Viscosity, Temperature effects, Thermal analysis, Phase transformations, Penetration tests, Synthetic materials

51-1809

Climatic reconstructions from the Eemian/Early Weichselian transition in central Europe based on the coleopteran record from Gröbern, Germany.

Walkling, A.P., Coope, G.R., *Boreas,* Sep. 1996, 25(3), p.145-159, 36 refs.

Paleoclimatology, Paleoecology, Climatic changes, Geological surveys, Lacustrine deposits, Quaternary deposits, Stratigraphy, Classifications, Air temperature, Germany—Gröbern

51-1810

Magnetic susceptibility record in the Polish and western Ukrainian loess-palaeosol sequences conditioned by paleoclimate.

Nawrocki, J., Wójcik, A., Bogucki, A., *Boreas,* Sep. 1996, 25(3), p.161-169, 30 refs.

Pleistocene, Paleoclimatology, Loess, Geomagnetism, Quaternary deposits, Profiles, Periglacial processes, Lithology, Sampling, Remanent magnetism, Geochronology, Marine deposits, Correlation, Poland—Carpathian Mountains, Ukraine—Bojanice

51-1811

Ice wastage and landscape evolution along the southern margin of the Laurentide ice sheet, north-central Wisconsin.

Ham, N.R., Attig, J.W., *Boreas,* Sep. 1996, 25(3), p.171-186, 63 refs.

Pleistocene, Ice sheets, Glacial geology, Paleoclimatology, Climatic changes, Ice deterioration, Frost mounds, Quaternary deposits, Landscape development, Glacial deposits, Ice solid interface, Topographic features, Permafrost transformation, United States—Wisconsin

51-1812

Early Holocene insect and plant remains from Jameson Land, East Greenland.

Böchner, J., Bennike, O., *Boreas,* Sep. 1996, 25(3), p.187-193, 33 refs.

Paleoecology, Paleoclimatology, Climatic changes, Quaternary deposits, Subpolar regions, Sedimentation, Migration, Wind factors, Biogeography, Correlation, Sampling, Radioactive age determination, Greenland—Jameson Land

51-1813

Scanning system for measuring the age-related luminescence of split sediment cores.

Poolton, N.R., et al, *Boreas,* Sep. 1996, 25(3), p.195-207, 35 refs.

Sensors, Probes, Infrared radiation, Soil profiles, Luminescence, Quaternary deposits, Coring, Age determination, Measuring instruments, Design, Light transmission, Optical properties, Geochronology

51-1814

Active groundwater circulation in a crystalline alpine formation: the Aiguilles Rouges (Haute-Savoie, France). [Les circulations actives des eaux souterraines des massifs cristallins alpins: exemple des Aiguilles Rouges (Haute-Savoie, France)]

Lhomme, D., Dzikowski, M., Nicoud, G., Payraud, B., Fudral, S., Guillot, P.L., *Académie des sciences, Paris. Comptes rendus. Série II a,* Oct. 17, 1996, 323(8), p.681-688, In French with English summary. 14 refs.

Alpine landscapes, Ground water, Springs (water), Hydrogeochemistry, Stream flow, Snowmelt, Meltwater, Snow hydrology, Water transport, Water table, Sampling, France—Haute-Savoie

51-1815

Interface position and centre concentration during freezing of carrot juice in cylindrical containers.

Mahmutoğlu, T., Esin, A., *Journal of the science of food and agriculture,* Aug. 1996, 71(4), p.531-536, 17 refs.

Frozen liquids, Solutions, Stefan problem, Ice solid interface, Ice water interface, Phase transformations, Liquid phases, Freezing front, Freezing points, Boundary value problems, Thermal conductivity, Mathematical models

51-1816

Middle Pleistocene (isotope stage 10) glacial sequence in the Stikine River valley, British Columbia.

Spooner, I.S., Osborn, G.D., Barendregt, R., Irving, E., *Canadian journal of earth sciences,* Oct. 1996, 33(10), p.1428-1438, With French summary. 39 refs.

Pleistocene, Glacial geology, Glacier oscillation, Glacial deposits, Glacial lakes, Glacier beds, Isotope analysis, Geomagnetism, Remanent magnetism, Stratigraphy, Geochronology, Geomorphology, Canada—British Columbia

51-1817

Minturn circles: a new glacial feature.

Appel, P.W.U., *Canadian journal of earth sciences,* Oct. 1996, 33(10), p.1457-1461, With French summary. 12 refs.

Glacial geology, Patterned ground, Glacial deposits, Ice sheets, Ice melting, Regelation, Rock mechanics, Models

51-1818

Permian alkaline basalts associated with formation of the Sverdrup Basin, Canadian Arctic.

Cameron, B.I., Muecke, G.K., *Canadian journal of earth sciences,* Oct. 1996, 33(10), p.1462-1473, With French summary. 47 refs.

Subpolar regions, Tectonics, Earth crust, Geological surveys, Magma, Geologic processes, Lithology, Geochemistry, Fluid dynamics, Canada—Northwest Territories—Ellesmere Island

51-1819

Big chill: a little ice in groundwater lets contractors drill San Diego shaft.

Kratch, K., *Water environment & technology,* July 1996, 8(7), p.15-16.

Artificial freezing, Ground water, Shafts (excavations), Shaft sinking, Soil stabilization, Waste treatment, Brines, Flow control, Engineering geology

51-1820

Palaeoclimates of Pangea - geological evidence.

Francis, J.E., *Canadian Society of Petroleum Geologists. Memoir,* Dec. 1994, No.17, Pangea: global environments and resources. Edited by A.F. Embry, B. Beauchamp and D.J. Glass, p.265-274, With French summary. Refs. p.273-274.

DLC QE511.5.P354 1994

Glacial geology, Tectonics, Geomorphology, Glaciation, Ice sheets, Rheology, Paleoclimatology

Palaeoclimates of Pangea (mid-Carboniferous to mid-Jurassic) range from glacial to hot and arid. During the Late Carboniferous extensive Gondwanan glaciation began, firstly with ice caps in South America and Australia in tectonically active regions where land was uplifted to high altitudes. The focus of glaciation moved from western Gondwana across South Africa, India, Antarctica and Australia as the South Pole shifted eastwards, until the last remnants of glaciation disappeared in the Late Permian. The hypothesis that Pangean climates were dominated by monsoonal-type circulation, related to Pangean continental configuration, which reached maximum strength during the Triassic is presented. The Early Triassic suggests the climate was very arid for a while but gradually became wetter in the Late Triassic and Early Jurassic. (Auth. mod.)

51-1821

Glaciers.

Knight, P.G., *Progress in physical geography,* Sep. 1996, 20(3), p.345-350, 24 refs.

Glaciology, Glacial hydrology, Glacial geology, Ice sheets, Stability, Subglacial drainage, Meltwater, Theories

The behavior of large ice sheets in response to climate change is a key element in the global environmental system. Knowledge of the history of ice-sheet fluctuations is central to understanding past environmental change and predicting the possible consequences of future environmental change. For example, the antarctic ice sheet currently has enough water in cold storage that if it were to melt in response to predicted greenhouse warming it could raise world sea level by as much as 66 m. The stability of the antarctic ice sheet is thus a major research question in glaciology. A major potential source of information about its stability is the history of its fluctuations in response to major environmental changes in the past. Over the last few years, the debate on this issue has focused closely on evidence from the Dry Valleys area of East Antarctica. Two contradictory hypotheses are at issue. One hypothesis proposes that the East Antarctic ice sheet has for much of its history been a highly dynamic feature, waxing and waning significantly in response to changing environmental conditions. The other hypothesis proposes that the ice sheet has existed as a stable feature in more or less its present state for at least the last 14 Ma. Evidence supports a model of partial deglaciation in Pliocene/early Pleistocene time, possibly with open seaways in the East Antarctic, followed by regrowth of East Antarctic ice sheet and substantial uplift of the Transantarctic Mountains. This paper discusses these hypotheses and other current glaciological research. (Auth. mod.)

51-1822

Paleozoic brachiopod symbioses: testing the limits of modern analogues in paleoecology.

Fagerstrom, J.A., *Geological Society of America. Bulletin,* Nov. 1996, 108(11), p.1393-1403, Refs. p.1401-1403.

Paleoecology, Pleistocene, Marine biology, Ocean bottom, Fossils, Structural analysis, Marine deposits, Marine biology, Classifications, Ecosystems, Models

51-1823

Coarse-particle transport in a gravel-bed river.

Emmett, W.W., Burrows, R.L., Chacho, E.F., Jr., MP 3923, *International journal of sediment research,* Aug. 1996, 11(2), p.8-21, 4 refs.

River flow, Hydraulics, Channels (waterways), Sediment transport, Gravel, Particle size distribution, Velocity measurement, Floodplains, Telemetering equipment, Geomorphology

Movement of bed material in the Toklat River, AK, was monitored during 1988 and 1989 by measuring transport rates with a Helley-Smith bedload sampler and by tracking and locating coarse sediment using radio transmitters implanted in natural sediment particles. Median bedload size was about 8 mm and transport rates ranged from less than 10 to nearly 3000 megagrams per day. Transport rate related to about the 1.6 power of water discharge in excess of discharge required to initiate tractive sediment motion. As transport rate increased, mean and maximum sizes of bedload tended to increase. Radio-tagged particles, mostly about 90 mm in diameter, moved distances between about 500 and 2,000 m during the 6-8

week periods of high flow. Limited data suggest that for moving rocks, large particles are likely to move as far as small particles (and at about the same speed).

51-1824

Surface and bulk diffusion of $H_2{}^{18}O$ on single-crystal $H_2{}^{18}O$ ice multilayers.

Brown, D.E., George, S.M., *Journal of physical chemistry,* 1996, 100(38), p.15460-15469, 65 refs.

Ice physics, Cloud physics, Polar stratospheric clouds, Ice vapor interface, Aerosols, Hydrates, Self diffusion, Vapor diffusion, Simulation, Lasers, Ice spectroscopy, Molecular energy levels

Heterogeneous reactions on polar stratospheric clouds (PSCs), in the arctic and antarctic atmosphere, composed of ice (type II PSC) and HNO_3 hydrates (type I PSC) have recently been shown to play a key role in polar ozone loss. The kinetics of these processes may be affected by H_2O mobility on the ice surface and in the underlying ice bulk. In a simulation of these processes, the experiments in this paper investigated the surface and bulk diffusion of $H_2{}^{18}O$ on crystalline $H_2{}^{16}O$ ice multilayers grown epitaxially on Ru(001). These experiments were conducted at temperatures from 155 to 165 K which are significantly lower than earlier measurements and are close to temperatures in the stratosphere. Extrapolation of these bulk diffusion data to stratospheric temperatures provided predictions for the H_2O residence time on the ice surface before diffusion into the underlying ice bulk. (Auth. mod.)

51-1825

On the characteristics and possible origins of ice in rock glacier permafrost.

Haeberli, W., Vonder Mühll, D., *Zeitschrift für Geomorphologie,* May 1996, Vol.104 (suppl.), p.43-57, With German summary. 50 refs.

Periglacial processes, Rock glaciers, Frozen ground mechanics, Permafrost transformation, Permafrost thermal properties, Ground ice, Ice formation, Origin, Active layer, Thaw weakening, Electrical resistivity, Boreholes

51-1826

Rejection and capture of cells by ice crystals on freezing aqueous solutions.

Bronshteĭn, V.L., Itkin, Y.A., Ishkov, G.S., *Journal of crystal growth,* 1981, Vol.52, p.345-349, 13 refs.

Solutions, Hydrodynamics, Ice physics, Cryobiology, Ice crystal growth, Impurities, Heterogeneous nucleation, Ice water interface, Freezing front, Polymers, Stability, Dielectric properties, Molecular energy levels

51-1827

Geometry of the glacier bed of the Unteraarglacier, Bernese Alps, Switzerland.

Funk, M., Gudmundsson, G.H., Hermann, F., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1994, Vol.30, p.187-194, With German summary. 21 refs.

Glacier surveys, Glacial geology, Glacier beds, Radio echo soundings, Mapping, Topographic features, Profiles, Glacier thickness, Ice solid interface, Sedimentation, Glacial erosion, Photogrammetric surveys, Switzerland—Unteraarglacier

51-1828

Studying arctic sea ice at two scales provides more accurate picture.

Overland, J.E., Weeks, W.F., *Eos,* Dec. 10, 1996, 77(50), p.501,505,506, 6 refs.

Sea ice distribution, Ice surveys, Ice mechanics, Surface structure, Ice plasticity, Ice floes, Drift, Air ice water interaction, Pressure ridges, Cracking (fracturing), Ice models, Arctic Ocean

51-1829

Snow surveying for the forecasting of stream flow—methods, factors and results in making spring predictions of summer water supply for irrigation and power in streams fed by mountain snows.

Church, J.E., Jr., *Engineering news-record,* 1921, 86(6), p.244-248, 5 refs.

Snow surveys, Snow hydrology, Snow cover distribution, Snow water content, Snow density, Runoff forecasting, Stream flow, Water supply, Meteorological factors, Temperature effects, Seasonal variations, Correlation, Statistical analysis

51-1830

Ice detector depends on resistive impedance. *R&D magazine,* Oct. 1996, p.11.

Sensors, Icing, Ice detection, Ice dielectrics, Electrical resistivity, Electronic equipment, Thermistors

51-1831

Putting power on ice.

Valenti, M., *Mechanical engineering,* Oct. 1996, p.70-72.

Electric power, Ice makers, Refrigeration, Air temperature, Temperature control, Cooling systems, Ice air interface, Ice (water storage), Heat recovery, Design

51-1832

Spatial modelling of snow water equivalent using airborne and ground-based snow data.

Carroll, S.S., Day, G.N., Cressie, N., Carroll, T.R., *Environmetrics,* 1995, Vol.6, p.127-139, 11 refs.

Water supply, Snow surveys, Snowmelt, Snow water equivalent, Stream flow, Runoff forecasting, Aerial surveys, Snow courses, Simulation, Mathematical models, Statistical analysis, Correlation, Accuracy

51-1833

Application of radiocarbon date estimates to the dating of glacial sequences: an example from the Miami sublobe, Ohio, U.S.A.

Lowell, T.V., *Quaternary science reviews,* 1995, Vol.14, p.85-99, Refs. p.97-99.

Quaternary deposits, Moraines, Glacial geology, Sampling, Stratigraphy, Radioactive age determination, Geochronology, Accuracy, Statistical analysis, United States—Ohio

51-1834

New Zealand glacier responses to climate change of the past century.

Chinn, T.J., *New Zealand journal of geology and geophysics,* 1996, Vol.39, p.415-428, 52 refs.

Glacier oscillation, Glacier surveys, Alpine glaciation, Climatic changes, Glacier melting, Global warming, Ice surface, Sedimentation, Snow line, New Zealand

51-1835

Ocean observing system for climate.

Nowlin, W.D., Jr., et al, *American Meteorological Society. Bulletin,* Oct. 1996, 77(10), p.2243-2273, 26 refs.

Climatology, Marine atmospheres, Global change, Climatic changes, Environmental protection, Remote sensing, Sea ice distribution, Ice volume, Ice surveys, Weather forecasting, Research projects, Models

51-1836

Modeling of melting in heterogeneous snow cover on a permeable frozen soil.

Tao, Y.X., *Numerical heat transfer A,* Aug. 9, 1996, 30(2), p.143-163, 13 refs.

Snow hydrology, Snow physics, Frozen ground thermodynamics, Wet snow, Snowmelt, Seepage, Soil water migration, Permeability, Ice formation, Snow cover effect, Mathematical models, Heat flux

51-1837

Runway slipperiness and aircraft operation.

Tanaka, T., *Japanese journal of tribology,* 1995, 40(10), p.1077-1086, Translated from Japanese Society of Tribologists. Journal. 8 refs.

Runways, Sliding, Traction, Rubber snow friction, Snow cover effect, Countermeasures

51-1838

Seismotectonics of arctic Canada.

Avetisov, G.P., *Izvestiia. Physics of the solid earth,* Dec. 1995, 31(5), p.374-385, Translated from Fizika zemli. 26 refs.

Tectonics, Arctic landscapes, Earthquakes, Isostasy, Seismology, Wave propagation, Stress concentration, Classifications, Canada

51-1839

Seismic refraction investigations on the crustal structure of the western Jameson Land Basin, East Greenland.

Fechner, N., Jokat, W., *Journal of geophysical research,* July 10, 1996, 101(B7), p.15,867-15,881, 33 refs.

Tectonics, Geological surveys, Earth crust, Subpolar regions, Seismic refraction, Imaging, Profiles, Mapping, Sedimentation, Stratification, Thickness, Greenland—Jameson Land

51-1840

Titan's 5 μm spectral window: carbon monoxide and the albedo of the surface.

Noll, K.S., Geballe, T.R., Knacke, R.F., Pendleton, Y.J., *Icarus,* Dec. 1996, 124(2), p.625-631, 39 refs.

Satellites (natural), Extraterrestrial ice, Regolith, Remote sensing, Ice detection, Albedo, Spectra, Photometry, Spectroscopy, Infrared reconnaissance, Geochemistry

51-1841

Identification of contaminated pixels in AVHRR composite images for studies of land biosphere.

Cihlar, J., *Remote sensing of environment,* June 1996, 56(3), p.149-163, 34 refs.

Remote sensing, Geophysical surveys, Spaceborne photography, Image processing, Resolution, Cloud cover, Ice cover effect, Snow cover effect, Albedo

51-1842

Papers.

International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995, Hutter, K., ed, *Annals of glaciology,* 1996, Vol.23, 410p., Refs. passim. Organized by the European Science Foundation (ESF) European Ice Sheet Modelling Initiative (EISMINT). For individual papers see 51-1843 through 51-1983 or E-56447, F-56422 through F-56434, F-56438, F-56440 through F-56446, F-56448 through F-56455, I-56435 through I-56437 and J-56439.

Ice sheets, Glacier flow, Glacier friction, Glacier oscillation, Glacier mass balance, Glacier heat balance, Glacial meteorology, Ice deformation, Computerized simulation

The 1995 International Symposium on Ice Sheet Modelling was organized by the European Science Foundation (ESF) program European Ice Sheet Modelling Initiative (EISMINT) and held in Chamonix, France on Sep. 18-22, 1995. There were 102 participants; 57 papers, 6 keynote talks and 24 poster papers were presented. About 60% of the presentations were submitted for publication in this volume; 34 of these are pertinent to Antarctica.

51-1843

EISMINT benchmarks for testing ice-sheet models.

Huybrechts, P., Payne, A.J., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.1-12, 24 refs.

Ice sheets, Glacier flow, Glacier thickness, Glacier heat balance, Glacier mass balance, Glacier oscillation, Glacial meteorology, Ice models, Computerized simulation, Mathematical models

A series of benchmark experiments designed for testing and comparing numerical ice-sheet models are presented. Following the outcome of two EISMINT workshops organized to intercompare large-scale ice-sheet models currently in operation, model benchmark experiments are described for ice sheets under fixed and moving margin conditions. These address both steady-state and time-dependent behavior under schematic boundary conditions and with prescribed physics. A comparison was made of each model's prediction of basic geophysical variables such as ice thickness, velocity and temperature. Consensus achieved in the model intercomparison provides reference solutions against which the accuracy and consistency of ice-sheet modelling codes can be assessed. (Auth.)

51-1844

Thermomechanical model of ice-shelf flow.

Rommelaere, V., Ritz, C., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.13-20, 23 refs.

Ice shelves, Glacier tongues, Glacier flow, Glacier friction, Glacier mass balance, Glacier heat balance, Ice models, Computerized simulation, Mathematical models

An ice-shelf model which features efficient numerical techniques is developed to determine the back-force exerted by sides and pinning points, such as islands of an embayed ice shelf. The model is applied

to three ideal geometries and shows that the restraint exerted by a small island, even far downstream from the grounding line, can represent about one-half of the total restraint due to the embayment. Results are further interpreted to suggest several criteria useful for testing any ice-shelf model. (Auth.)

51-1845

Computer scheme for rapid calculations of balance-flux distributions.

Budd, W.F., Warner, R.C., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.21-27, 21 refs.

Ice sheets, Glacier flow, Glacier thickness, Glacier mass balance, Glacier oscillation, Ice models, Computerized simulation, Mathematical models, Antarctica—Wilkes Land

A simple computer scheme developed by Budd and Smith (1985) and modified by D. Jenssen has been further developed to provide a rapid computation of steady-state balance fluxes over arbitrary ice masses, given the surface elevations and net accumulation distribution. The scheme provides a powerful diagnostic tool to examine the flux and state of balance over whole ice masses or limited regions to interpret field observations for dynamics or the state of balance. Applications are demonstrated for the whole of Antarctica and for regional areas. Comparisons are made between fluxes computed from observed ice thickness and velocities and those computed from balance. The observed ice thicknesses can also be used to compute surface velocities from assumed column-to-surface velocity ratios. The combined fluxes from observations and balance can be used to compute rates of change of elevation with time. (Auth. mod.)

51-1846

Simplified multi-scale model for predicting climatic variations of the ice-sheet surface elevation in central Antarctica.

Salamatin, A.N., Ritz, C., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.28-35, 26 refs.

Ice sheets, Glacier thickness, Glacier oscillation, Glacier mass balance, Glacial meteorology, Ice age theory, Paleoclimatology, Global change, Ice models, Computerized simulation, Mathematical models, Antarctica—Vostok Station

The equation describing the surface evolution of a large ice sheet is examined on the basis of a scale analysis applied to antarctic conditions. Changes in the surface elevation are mainly driven by mass-balance fluctuations which approximately follow global atmospheric temperature variations. The dynamic interaction of the time-lagging interior with the quasi-stationary margin is described. As a result, a simplified model is deduced to simulate the surface-elevation variations in the central parts of the antarctic ice sheet caused by mass-balance perturbations corresponding to the main Milankovich cycles with the periods of 19-100 ky. The sensitivity of the model to phyiscal factors (represented by dimensionless tuning parameters) is discussed. Climatically controlled variations of the ice-sheet thickness in the vicinity of Vostok Station during the past 200 ky are estimated. (Auth. mod.)

51-1847

Mass-balance modelling of the Greenland ice sheet: a comparison of an energy-balance and a degree-day model.

Van de Wal, R.S.W., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.36-45, 28 refs.

Ice sheets, Glacier mass balance, Glacier heat balance, Glacier ablation, Glacier oscillation, Glacial meteorology, Degree days, Global warming, Sea level, Computerized simulation, Greenland

51-1848

Ice-shelf model test based on the Ross Ice Shelf, Antarctica.

MacAyeal, D.R., Rommelaere, V., Huybrechts, P., Hulbe, C.L., Determann, J., Ritz, C., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.46-51, 15 refs.

Ice shelves, Glacier flow, Glacier friction, Glacier oscillation, Glacier tongues, Ice water interface, Ice models, Computerized simulation, Mathematical models, Antarctica—Ross Ice Shelf

A standard numerical experiment featuring the Ross Ice Shelf is presented as a test package for the development and intercomparison of ice-shelf models. The emphasis of this package is solution of stress-equilibrium equations for an ice-shelf velocity consistent with present observations. As a demonstration, the authors compare 5 independently developed ice-shelf models based on finite-difference and finite-element methods. Results suggest that there is little difference between finite-element and finite-difference methods in capturing the basic, large-scale flow features of the ice shelf. Additionally they show that the fit between model and observed velocity depends strongly on the ice-shelf temperature field, for which there is presently little observational control. The main differences between model results are due to the equations being solved, the boundary conditions at the ice front and the discretization method (finite element vs finite difference). (Auth.)

51-1849

Modelled ice-sheet margins of three Greenland ice-sheet models compared with a geological record from ice-marginal deposits in central West Greenland.

Van Tatenhove, F.G.M., Fabre, A., Greve, R., Huybrechts, P., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.52-58, 26 refs.

Ice sheets, Glaciation, Glacial geology, Glacier oscillation, Glacial meteorology, Moraines, Paleoclimatology, Global change, Sea level, Geochronology, Computerized simulation, Greenland

51-1850

Modelling of a marine glacier and ice-sheet-ice-shelf transition zone based on asymptotic analysis.

Chugunov, V.A., Vil'chinskiĭ, A.V., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.59-67, 13 refs.

Ice sheets, Ice shelves, Glacier beds, Glacier flow, Glacier friction, Glacier thickness, Ice water interface, Mathematical models

All parts of a two-dimensional, isothermal, stationary marine glacier (grounded ice sheet, ice shelf and transition zone) with constant viscosity are analyzed by perturbation methods. In so doing, all zones of different flow patterns can be considered separately. Correlations between spatial scales for all parts can be expressed in terms of the typical ice-surface slope distant from the ocean, which reflects exterior conditions of the glacier's existence. In considering the ice-sheet-ice-shelf transition zone, a small parameter characterizing the difference between ice and water densities is used. Such an analysis allows us to find boundary conditions at the grounding line for the grounded ice mass. Glacier-surface profiles are determined by numerical methods. The grounding-line position found by using the boundary conditions derived in this paper differs from that obtained by using Thomas and Bentley's (1978) boundary conditions by about 10% of the grounded ice-stream length. (Auth.)

51-1851

Ice-sheet surging and ice-stream formation.

Fowler, A.C., Johnson, C., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.68-73, 13 refs.

Ice sheets, Glacier flow, Glacier surges, Glacier oscillation, Glacier friction, Subglacial drainage, Basal sliding, Paleoclimatology, Mathematical models, Antarctica—Siple Coast

A simplified model of ice-sheet behavior is described. It combines the assumptions of rapid ice flow, high viscous activation energy and realistic sediment-based sliding dynamics to form a non-linear diffusion-type equation which can display relaxation oscillations analogous to those of surging glaciers, and which may be relevant to large-scale surges of the Hudson Strait and Cabot Strait ice streams of the Laurentide ice sheet. When the physics of this model is applied to a laterally extensive unidirectional ice flow, such as that in the Siple Coast of Antarctica, an appropriate mechanism may exist for the spontaneous generation of ice streams. (Auth.)

51-1852

Time-step limits for stable solutions of the ice-sheet equation.

Hindmarsh, R.C.A., Payne, A.J., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.74-85, 15 refs.

Ice sheets, Glacier thickness, Glacier oscillation, Glacier flow, Glacier friction, Ice models, Computerized simulation, Mathematical models

Various spatial discretizations for the ice sheet are compared for accuracy against analytical solutions in one and two dimensions. The computational efficiency of various iterated and non-iterated marching schemes is compared. The stability properties of different marching schemes, with and without iterations on the non-linear equations, are compared. Newton-Raphson techniques permit the largest time steps. A new technique, which is based on the fact that the dynamics of unstable iterated maps contain information about where the unstable root lies, is shown to improve substantially the performance of Picard iteration at a negligible computational cost. (Auth.)

51-1853

Adaptive-grid finite-volume model of glacier-terminus fluctuations.

Lam, J.K.W., Dowdeswell, J.A., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.86-93, 28 refs.

Glacier oscillation, Glacier flow, Glacier friction, Glacier mass balance, Glacier tongues, Computerized simulation, Mathematical models

51-1854

Stochastic perturbation of divide position.

Hindmarsh, R.C.A., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.94-104, 23 refs.

Ice sheets, Glacier flow, Glacier friction, Glacier mass balance, Glacier surfaces, Glacier oscillation, Computerized simulation, Statistical analysis, Mathematical models, Antarctica—Antarctic Peninsula, Antarctica—East Antarctica, Greenland

Perturbation of divide position is considered by a linearization about the Vialov-Nye solution and also about related solutions with O(1) relief. Relaxation times of one-sixteenth the fundamental thickness/accumulation-rate time-scale are found for the Vialov-Nye configuration, while substantial basal topography can halve the rate of relaxation. Steady divide position is most sensitive to anti-symmetric accumulation-rate distributions near the divide, but transient divide motion is most strongly excited by anti-symmetric accumulation rate variations halfway between the margin and the divide. Relaxation times for the Antarctic Peninsula divide position are estimated to be around 200 years, while the larger Greenland ice sheet has a divide-position relaxation time of around 600 years. Modelling accumulation rate as a white-noise process permits analysis of divide perturbation as a (stochastic) Ornstein-Uhlenbeck process, where the standard deviation of the response is proportional to the standard deviation of the forcing. If observed accumulation-rate variability in the Antarctic Peninsula were anti-symmetric about the divide, it would be sufficient to force the divide position to fluctuate with standard deviation 10-20 times the depth of the ice sheet. (Auth. mod.)

51-1855

Stability of ice rises and uncoupled marine ice sheets.

Hindmarsh, R.C.A., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.105-115, 22 refs.

Ice sheets, Ice shelves, Glacier flow, Glacier friction, Glacier mass balance, Ice water interface, Computerized simulation, Mathematical models

An analysis of the linear stability of marine ice sheets uncoupled from associated ice shelves is presented. The principal feature is a zero eigenvalue associated with infinitesimal shifts along the line of neutral equilibrium in phase space, termed the "equilibrium manifold". A finite-difference scheme is constructed which respects this stability property. The zero eigenvalue appears to allow modelling errors to accumulate rather than dissipate as occurs in land-based ice sheets. The practical significance of this is that even rather fine spatial grids may allow substantial numerical error to accumulate. (Auth.)

51-1856

Steady-state thermomechanical modelling of ice flow near the centre of large ice sheets with the finite-element technique.

Hvidberg, C.S., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.116-123, 30 refs.

Ice sheets, Glacier flow, Glacier friction, Glacier mass balance, Glacier heat balance, Glacier surfaces, Computerized simulation, Mathematical models

A finite-element model is developed in order to calculate the coupled ice and heat flow and the surface topography in cold, steady-state ice sheets. The model decouples the heat-flow equation and the surface mass-balance condition from the rest of the equations and solves the problem by an iterative method. The model is used to examine the thermomechanics of ice divides. Initial studies of a symmetric, plane ice divide and an axisymmetric ice divide have led to the following conclusions, which are consistent with previous results. The ice-divide zone is a narrow region, only a few ice thicknesses wide, where the surface slope drops to zero and the flow solution changes. The longitudinal strain rate is high, especially in the upper layers, and the vertical velocity is smaller than away from the divide. This causes the basal temperatures to increase and the isochrones to rise. Divergent-flow conditions widen the ice-divide zone, whereas they do not influence the solution at the ice divide. (Auth.)

51-1857

On the gravity-driven shear flow of an ice-till mixture.

Wu, T., Jöhnk, K., Svendsen, B., Hutter, K., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.124-128, 8 refs.

Glacier flow, Glacier friction, Glacier beds, Glacial till, Sediment transport, Shear flow, Mathematical models

51-1858

Model experiments on the evolution and stability of ice streams.

Van der Veen, C.J., Whillans, I.M., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.129-137, 26 refs.

Ice sheets, Ice shelves, Glacier flow, Glacier friction, Glacier beds, Computerized simulation, Mathematical models, Antarctica—Byrd Glacier

A simple model is developed based on the notion that on active ice streams the resistance to flow is partitioned between basal drag and lateral drag. The relative roles of these sources of resistance is determined by a friction parameter that effectively describes the strength of the bed under the ice stream. Reduction in the basal strength is caused by meltwater production, taken proportional to the product of basal drag and ice speed. The width of the ice stream is governed by the balance between entrainment or erosion of ice from the slow-moving inter-stream ridges and advection from the ridges into the ice stream. Entrainment of ridge ice is parameterized as a function of the shear stress at the lateral margins, in one case proportional to the lateral shear stress and in the second case scaled to ice-stream width. In the first formulation, the model rapidly becomes unstable but, using the second formulation, a steady state is reached with lateral drag providing all or most of the resistance to flow. The results point to the great importance of achieving an understanding of entrainment. With the second model and a wide range of parameter values, there is no cyclic behavior, with rapid flow being followed by a quiescent phase. (Auth.)

51-1859

Modeling heat, mass, and species transport in polar firn.

Albert, M.R., MP 3924, *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.138-143, 22 refs.

Snow air interface, Snow permeability, Snow heat flux, Snow composition, Snow ice interface, Firn stratification, Glacier ice, Ice composition, Ice cores, Mathematical models, Greenland

A finite-element model for simulating multi-dimensional air flow with heat, mass and chemical species transport through firn is discussed. The model is applied to an investigation of near-surface layering effects on ventilation rates. Field measurements of permeability at Summit, Greenland, are presented that show that permeability varies by at least a factor of 10 over the top 3 m, with the surface windpack having much lower permeability, in general, than the underlying firn. The effect of a lower-permeability surface layer is to decrease the air flow in the underlying firn, yet there is still sufficient air flow in the top meters of the firn so that ventilation must be considered for species transport. Channeling, or increased air flow in a layer overlain by a less-permeable layer, can occur even if the microstructure of each layer is isotropic. Conventional estimates of chemical transport due to diffusion alone are likely to underestimate transport, while estimates of ventilation that consider the firn as a homogeneous half-space may overestimate ventilation effects at the near-surface. Effects of firn layering are important for ventilation and must be considered for accurate assessment of firn-air transport mechanisms.

51-1860

Increased ablation of Wisconsin ice in eastern Greenland: observations and modelling.

Bøggild, C.E., Oerter, H., Tukiainen, T., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.144-148, 13 refs.

Ice sheets, Glacier surfaces, Glacier heat balance, Glacier ablation, Ice cores, Ice composition, Dust, Albedo, Paleoclimatology, Greenland

51-1861

Models of ice-atmosphere interactions for the Greenland ice sheet.

Braithwaite, R.J., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.149-153, 51 refs.

Ice sheets, Glacier heat balance, Glacier mass balance, Glacial meteorology, Glacier ablation, Glacier melting, Glacier alimentation, Ice air interface, Computerized simulation, Greenland

51-1862

Climate sensitivity of the ice cap of King George Island, South Shetland Islands, Antarctica.

Knap, W.H., Oerlemans, J., Cadée, M., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.154-159, 16 refs.

Glacial meteorology, Glacier flow, Glacier mass balance, Glacier oscillation, Glacier ablation, Global warming, Computerized simulation, Antarctica—King George Island

A two-dimensional vertically integrated ice-flow model has been used to simulate the current state of the ice cap of King George I. as well as the sensitivity of this state to climate change. The model was forced by an energy-balance model that generates the specific mass balance from climatological input data of two research stations. It was possible to simulate a steady-state ice cap whose volume and areal extent approximate the (estimated) current situation. Several experiments have indicated that this state is highly sensitive to climate change. The model predicts that cooling by 1 K will increase the ice volume by 10% and warming by 1 K will decrease it by 36%. A 10% change in precipitation will alter the ice volume by less than 8%. Application of the IPCC-90 Business-as-Usual scenario leads to a 55% reduction in the ice volume by the year 2100, compared to the present-day situation. The response of the ice cap to warming is therefore totally different from the response of the main antarctic ice sheet which is believed to gain mass by increasing temperatures. (Auth. mod.)

51-1863

Characteristics of the lower ablation zone of the West Greenland ice sheet for energy-balance modelling.

Van den Broeke, M., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.160-166, 24 refs.

Ice sheets, Glacial meteorology, Glacier heat balance, Glacier melting, Glacier ablation, Glacier surveys, Computerized simulation, Greenland

51-1864

Ice-sheets' surface mass-balance evaluation in the UGAMP GCM: the climate of Antarctica.

Marsiat, I., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.167-173, 35 refs.

Ice sheets, Glacial meteorology, Glacier surfaces, Glacier mass balance, Glacier heat balance, Glacier oscillation, Polar atmospheres, Atmospheric circulation, Global change, Computerized simulation, Antarctica

General Circulation Models (GCMs) will be more and more used for coupled climatic simulations involving ice sheets. It is therefore of prime importance to evaluate the performance of these models in simulating the mass balance and climate over ice sheets. The antarctic climate simulated with the U.K. Universities Global Atmospheric Modelling Programme General Circulation Model is in good agreement with the available observations. In particular, the accumulation pattern appears fairly reasonable. Some imperfections are related to the surface temperature and energy budget but without severe consequences for the atmosphere behavior. Refining the snow-related parameterizations could improve the results of the model in high latitudes. (Auth.)

51-1865

Seasonal energy-balance climate model for coupling to ice-sheet models.

Paul, A., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.174-180, 24 refs.

Ice sheets, Glacier heat balance, Glacier oscillation, Glacial meteorology, Ice age theory, Global change, Atmospheric circulation, Computerized simulation, Mathematical models

An energy-balance climate model designed for coupling to ice-sheet models is presented. Its independent variables are longitude, latitude and time of the year. The model is based on the vertically integrated equations of conservation of energy and humidity. It can predict the vertically averaged temperature. Since it includes a hydrological cycle, it can also diagnose the net fresh-water flux and hence the annual snow budget at the atmosphere-ice-sheet interface. To this end, the model does not require observed precipitation rates. The computational cost is reduced by using an analytically computed Fourier-Legendre representation of daily insolation. For a highly idealized test-case configuration, two simple sensitivity experiments are carried out. (Auth.)

51-1866

On elevation models as input for mass-balance calculations of the Greenland ice sheet.

Van de Wal, R.S.W., Ekholm, S., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.181-186, 17 refs.

Ice sheets, Glacier thickness, Glacier surfaces, Glacier mass balance, Glacier oscillation, Computerized simulation, Greenland

51-1867

Present and future mass balance of the ice sheets simulated with GCM.

Ohmura, A., Wild, M., Bengtsson, L., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.187-193, 30 refs.

Ice sheets, Glacier mass balance, Glacier oscillation, Glacial meteorology, Atmospheric circulation, Global warming, Sea level, Computerized simulation, Greenland, Antarctica

A high-resolution GCM ECHAM3T106 was used to simulate the climates of the present and of the future under doubled CO_2. The ECHAM3T106 was integrated for an equivalent time of 5 years with the observed SST of the 1980s, and with the SST for the 2 x CO_2 climate generated from the ECHAM1T21 coupled transient experiment. The main motivation for using the GCM to simulate the mass balance is the level of skill in simulating precipitation and accumulation recently achieved in the high-resolution GCM experiment. The ablation is computed, based on the GCM internal surface fluxes and the temperature/ablation relationship formulated on the Greenland field data. The two ice sheets show very different reactions towards doubling the CO_2. As the decrease in accumulation and the increase in ablation in Greenland cause an annual mean specific mass balance of -225 mm (eq. -390 km^3), the increase in accumulation and virtually non-melt conditions in Antarctica result in a mean annual specific mass balance of +23 mm (eq. +325 km^3). The sum of the mass balance on both ice sheets is equivalent to the annual sea-level rise of 0.2 mm. (Auth. mod.)

51-1868

Modelling fabric development along the GRIP ice core, central Greenland.

Castelnau, O., Thorsteinsson, T., Kipfstuhl, J., Duval, P., Canova, G.R., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.194-201, 49 refs.

Ice sheets, Ice cores, Firn stratification, Glacier ice, Ice structure, Ice crystal structure, Ice deformation, Ice plasticity, Ice dating, Computerized simulation, Greenland

51-1869

Anisotropic flow law for ice-sheet ice and its implications.

Azuma, N., Goto-Azuma, K., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.202-208, 13 refs.

Ice sheets, Glacier flow, Glacier friction, Glacier ice, Ice structure, Ice deformation, Ice creep, Ice cores, Ice dating, Mathematical models

A new flow law for anisotropic polycrystalline ice is presented. The strain-rate tensor is related by a geometrical factor tensor (G) to the stress tensor. The G factor tensor can be obtained from the *c*-axis fabric data and stress condition. This new flow law describes well the direction-dependent mechanical properties of anisotropic ice which cannot be demonstrated by Glen's flow law. For example, the new flow law can explain the fact that a strong single-maximum fabric ice, such as Dye 3 Wisconsin ice, can deform several times faster than isotropic ice under horizontal shear but can hardly deform under vertical or horizontal normal stress. The authors also show that at a deeper part of an ice sheet, where a single-maximum fabric develops, a positive vertical strain rate can be produced with only a horizontal shear stress. (Auth.)

51-1870

Mapping of glacial motion and surface topography of Hielo Patagónico Norte, Chile, using satellite SAR L-band interferometry data.

Rignot, E., Forster, R., Isacks, B., *Annals of glaciology*, 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.209-216, 21 refs.

Glacier surveys, Glacier flow, Glacier surfaces, Glacier mass balance, Glacier oscillation, Topographic surveys, Synthetic aperture radar, Spaceborne photography, Chile—Patagonia

51-1871

Ocean tides under the Filchner-Ronne Ice Shelf, Antarctica.

Smithson, M.J., Robinson, A.V., Flather, R.A., *Annals of glaciology*, 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.217-225, 21 refs.

Ice shelves, Ice water interface, Tides, Ocean currents, Computerized simulation, Mathematical models, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf, Antarctica—Weddell Sea

A depth-averaged finite-difference numerical model has been used to make a preliminary study of the tides under the Filchner-Ronne Ice Shelf. Open boundary conditions were specified using the global ocean model of Schwiderski. Tidal constituents for the two principal semi-diurnal constituents M_2 and S_2, and the two principal diurnal constituents O_1 and K_1 were extracted from computed sea-surface elevations by harmonic analysis. Measured values near to the grounding line could only be reproduced satisfactorily by increasing the bottom friction coefficient under the ice to 50 times the open-ocean value. This destroys any agreement near the ice front or at pelagic sites. It is thought that a friction coefficient which varies with distance under the ice would be able to reproduce better all the available measurements. More tidal measurements are required to validate any model of the region with model experiments being used to help pinpoint possible sites for instrument deployment. (Auth.)

51-1872

Basal temperature conditions of the Greenland ice sheet during the glacial cycles.

Huybrechts, P., *Annals of glaciology*, 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.226-236, 26 refs.

Ice sheets, Glacier beds, Glacier flow, Glacier friction, Glacier mass balance, Glacier heat balance, Ice temperature, Paleoclimatology, Computerized simulation, Mathematical models, Greenland

51-1873

Numerical modelling of a fast-flowing outlet glacier: experiments with different basal conditions.

Pattyn, F., *Annals of glaciology*, 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.237-246, 29 refs.

Ice sheets, Glacier flow, Glacier friction, Glacier beds, Basal sliding, Glacier mass balance, Glacier heat balance, Computerized simulation, Mathematical models, Antarctica—Shirase Glacier

Recent observations in Shirase Drainage Basin, show that the ice sheet is thinning at the considerable rate of 0.5-1.0 m/a. Surface velocities in the stream area reach more than 2000 m/a, making Shirase Glacier one of the fastest-flowing glaciers in East Antarctica. A numerical investigation of the present stress field in Shirase Glacier shows the existence of a large transition zone 200 km in length where both shearing and stretching are of equal importance, followed by a stream zone of approximately 50 km, where stretching is the major deformation process. To improve insight into the present transient behavior of the ice-sheet system, a two-dimensional time-dependent flowline model has been developed, taking into account the ice-stream mechanics. Experiments were carried out with different basal motion conditions in order to understand their influence on the dynamic behavior of the ice sheet and the stream area in particular. Results revealed that when basal motion becomes the dominant deformation process, (partial) disintegration of the ice sheet is counteracted by colder basal-ice temperatures due to higher advection rates. This gives rise to a cyclic behavior in ice-sheet response and large changes in local imbalance values. (Auth. mod.)

51-1874

Deformation rates in combined compression and shear for ice which is initially isotropic and after the development of strong anisotropy.

Li, J., Jacka, T.H., Budd, W.F., *Annals of glaciology*, 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.247-252, 22 refs.

Ice sheets, Glacier flow, Glacier friction, Ice pressure, Ice structure, Ice deformation, Ice creep, Strain tests, Mathematical models

Laboratory-prepared fine-grained, initially isotropic polycrystalline ice samples were deformed under conditions of simple shear with simultaneous uniaxial compression at a constant temperature of -2.0°C. The aim was to investigate the effects of stress configuration on the flow rate of initially isotropic ice and on ice with subsequent stress and strain-induced anisotropy. Experiments were carried out for various combinations of shear and compression with shear stress ranging from 0 to 0.49 MPa and compressive stress ranging from 0 to 0.98 MPa, but such that for every experiment the octahedral shear stress was 0.4 MPa. The strain curves resulting from the experiments clearly exhibit minimum strain rates while the ice is still isotropic, and steady-state tertiary strain rates along with the development of steady-state anisotropic fabric patterns. The present tests indicate that the enhancement factor for steady-state tertiary octahedral shear-strain rate depends on the shear or compression fraction and varies from about 10 for simple shear (with zero compression) to about 3 for uniaxial compression (with zero shear). (Auth. mod.)

51-1875

Model for the tangent viscous behaviour of anisotropic polar ice.

Meyssonnier, J., Philip, A., *Annals of glaciology*, 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.253-261, 34 refs.

Ice sheets, Glacier flow, Glacier friction, Ice pressure, Ice deformation, Ice plasticity, Ice creep, Ice structure, Ice crystal structure, Dislocations (materials), Computerized simulation, Mathematical models

During the deformation of polar ice, a fabric develops which results in a macroscopically anisotropic behavior. Since the plastic anisotropy of the ice single crystal is very high, the effect of a strong (single maximum) fabric on the macroscopic flow law cannot be neglected when simulating the flow of an ice sheet. The authors propose to model polar ice as a transversely isotropic medium; while simplifying the problem, this captures the essential features of the *in-situ* observed fabrics. The macroscopic mechanical behavior of the ice polycrystal is obtained by using an orientation distribution function (ODF) for the *c*-axes of the grains, which characterizes the fabric, and a self-consistent scheme, considering each single crystal as transversely isotropic. The evolution of the ODF is described by a conservation equation. (Auth. mod.)

51-1876

Continuum approach for modelling induced anisotropy in glaciers and ice sheets.

Svendsen, B., Hutter, K., *Annals of glaciology*, 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.262-269, 16 refs.

Ice sheets, Glacier flow, Glacier friction, Ice elasticity, Ice deformation, Ice creep, Ice structure, Dislocations (materials), Computerized simulation, Mathematical models

This paper presents a formulation of a continuum model for so-called (stress or deformation) induced anisotropy in natural ice which, unlike computer-based Taylor-type models, can be incorporated in numerical simulations of large ice masses to account for the effects of this process on the flow of these bodies in a physical fashion. To do this, the authors treat natural ice as a rigid-elastic, non-linear inelastic material which can develop transverse isotropic behavior where the degree of such anisotropy at each point is controlled by the distribution of crystal glide-plane orientations there. This distribution is described by a so-called orientation-distribution function, for which an evolution relation can be derived. The central constitutive assumption of this formulation relates this distribution to the "structure" tensor representing the transverse isotropy of the material. On the basis of this relation, the model predicts in particular isotropic (e.g. classical Glen's flow-law type) behavior at a given point when the distribution of crystal glide-plane orientations is uniform there. (Auth.)

51-1877

Relative strengths of debris-laden basal ice and clean glacier ice: some evidence from Taylor Glacier, Antarctica.

Lawson, W., *Annals of glaciology*, 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.270-276, 12 refs.

Glacier flow, Glacier friction, Glacier beds, Glacial till, Glacier ice, Ice sampling, Ice temperature, Ice pressure, Ice strength, Ice deformation, Ice creep, Antarctica—Taylor Glacier

An understanding of the mechanical behavior of the basal zone of an ice mass is fundamental to understanding the overall dynamics of that ice mass. Despite the fact that debris-laden ice is found in the basal zones of many glaciers and ice sheets, its mechanical behavior is only poorly understood. This paper attempts to expand the knowledge of the mechanical behavior of debris-laden ice by examining the uniaxial compressive strength of debris-laden basal ice sampled from the snout of the Taylor Glacier. At the relatively warm temperatures at which uniaxial compressive strength tests were conducted in the field, debris-laden ice was generally weaker than clean glacier ice. At these temperatures, between 0° and -5°C, pressure melting was the dominant deformation mechanism in the debris-laden ice and cracking the dominant deformation mechanism in clean ice. At -25°C, however, debris-laden ice reached higher strengths than the clean glacier ice and cracking was the dominant deformation mechanism in both ice types. Results suggest that the dynamic effects and significance of the presence of a debris-laden ice layer in the basal zone of an ice mass are likely to be highly variable in space and time. (Auth. mod.)

51-1878

Ice-sheet flow features and rheological parameters derived from precise altimetric topography.

Rémy, F., Ritz, C., Brisset, L., *Annals of glaciology*, 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.277-283, 31 refs.

Ice sheets, Glacier flow, Glacier friction, Glacier heat balance, Glacier thickness, Glacier beds, Glacier surfaces, Ice deformation, Ice creep, Topographic surveys, Radio echo soundings, Spaceborne photography, Antarctica

For the first time high-quality coverage of the ERS-1 radar altimeter provides a very accurate surface topographic map covering 80% of the antarctic ice sheet that can contribute significantly to glaciological studies such as ice-sheet flow modelling. The topography allows estimation of the ice-flow direction, the balance velocity and the basal shear stress. A relationship between shear stress, basal temperature and a parameter related to strain rate helps in mapping the behavior anomalies of these parameters. Longitudinal stress, sliding, bedrock topography and variation in the pre-exponential factor of the flow law are found to play a major role in the ice-flow pattern. This relation can also be used to estimate rheological parameters; the Glen exponent n is found to be 1 for T<-10°C and 3-4 for higher temperatures, where Q is found to be 70 kJ/mol. (Auth.)

51-1879

Experimental fracture and mechanical properties of antarctic ice: preliminary results.

Rist, M.A., Sammonds, P.R., Murrell, S.A.F., Meredith, P.G., Oerter, H., Doake, C.S.M., *Annals of glaciology*, 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.284-292, 22 refs.

Ice shelves, Glacier friction, Glacier ice, Ice strength, Ice elasticity, Ice deformation, Ice cracks, Crevasses, Crack propagation, Computerized simulation, Antarctica—Ronne Ice Shelf

An experimental study of the fracture mechanics and rheology of ice from the Ronne Ice Shelf is currently being undertaken. The apparent critical stress-intensity factor (or apparent fracture toughness, K_Q) for crack propagation has been measured using a three-point bend method for inducing crack growth perpendicular to the axis of cylindrical ice-core specimens. Tensile crack nucleation under applied uniaxial compressive stress has also been evaluated. Both methods have allowed a profile of ice elastic and fracture properties with depth through the ice shelf to be constructed. The resistance to fracture, as measured by changes in apparent fracture toughness and crack-nucleation stress, increases with depth right through the firn and meteoric ice layers. A simple fracture mechanics model applied to the Ronne Ice Shelf indicates that crevasses form from small surface cracks, less than 40 cm deep, which quickly grow to depths of 40-60 m and then remain stable. (Auth. mod.)

51-1880

Development of microstructure in the high-temperature deformation of ice.

Wilson, C.J.L., Zhang, Y.H., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.293-302, 19 refs.

Ice structure, Ice microstructure, Ice crystal structure, Ice elasticity, Ice plasticity, Ice deformation, Ice creep, Recrystallization, Dislocations (materials), Computerized simulation

51-1881

Glaciation, erosion and the evolution of the Transantarctic Mountains, Antarctica.

Kerr, A., Gilchrist, A.R., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.303-308, 20 refs.

Ice sheets, Glaciation, Glacial geology, Glacial erosion, Isostasy, Tectonics, Earth crust, Geochronology, Computerized simulation, Antarctica—Transantarctic Mountains

Modelling studies of the tectonic evolution of the Transantarctic Mountains have drawn differing conclusions as to the primary mechanism involved. None has considered the role of the East Antarctic ice sheet in detail. The authors use a denudation-flexural model to examine the isostatic response of the continental margin to glacial erosion to determine whether glacial processes have played a role in forcing mountain uplift. The conclusion is that, although there are insufficient data formally to delimit the role of glacial erosion, available geophysical and geomorphological data are not inconsistent with the results of the differential denudation model, providing certain conditions are met. These results indicate that the current topography of the Transantarctic Mountains can be simulated, in part, from the isostatic response of the lithosphere to glacial erosion. (Auth. mod.)

51-1882

Comparison of different ways of dealing with isostasy: examples from modelling the antarctic ice sheet during the last glacial cycle.

Le Meur, E., Huybrechts, P., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.309-317, 33 refs.

Ice sheets, Glaciation, Glacial geology, Glacier beds, Bedrock, Isostasy, Tectonics, Earth crust, Geochronology, Computerized simulation, Antarctica

The bedrock isostatic response exerts a strong control on ice-sheet dynamics and is therefore always taken into account in ice-sheet models. This paper reviews the various methods normally used in the ice-sheet modelling community to deal with the bedrock response and compares these with a more sophisticated full-Earth model. Each of these bedrock treatments, five in total, is coupled with a three-dimensional thermomechanical ice-sheet model under the same forcing conditions to simulate the antarctic ice sheet during the last glacial cycle. The outputs of the simulations are compared on the basis of the time-dependent behavior for the total ice volume and the mean bedrock elevation during the cycle and of the present rate of uplift over Antarctica. This comparison confirms the necessity of accounting for the elastic bending of the lithosphere in order to yield realistic bedrock patterns. It furthermore demonstrates the deficiencies inherent to the diffusion equation in modelling the complex deformation within the mantle. This overview attempts to point out the main advantages and drawbacks of each of these methods and to determine which one is most appropriate depending on the specific modelling requirements. (Auth. mod.)

51-1883

Isostatic postglacial rebound over Fennoscandia with a self-gravitating spherical visco-elastic Earth model.

Le Meur, E., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.318-327, 30 refs.

Ice sheets, Glaciation, Glacial geology, Isostasy, Tectonics, Earth crust, Geochronology, Computerized simulation, Norway, Sweden, Finland

51-1884

Dynamic/thermodynamic simulations of Laurentide ice-sheet instability.

Greve, R., MacAyeal, D.R., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.328-335, 24 refs.

Ice sheets, Glaciation, Glacial geology, Glacier oscillation, Ice rafting, Marine deposits, Paleoclimatology, Ice age theory, Geochronology, Computerized simulation

51-1885

Sensitivity tests of coupled ice-sheet/ice-stream dynamics in the EISMINT experimental ice block.

Marshall, S.J., Clarke, G.K.C., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.336-347, 16 refs.

Ice sheets, Glacier flow, Glacier friction, Glacier mass balance, Glacier oscillation, Ice deformation, Ice creep, Ice age theory, Computerized simulation, Mathematical models

A continuum mixture model of coupled ice-sheet/ice-stream dynamics has been developed within a conventional three-dimensional finite-difference model framework. The ice mass is areally divided into sheet-ice and stream-ice components. Dynamic evolution of each component is solved with coupling terms to describe mass exchange between flows. In this way, ice-stream fluxes can be incorporated in a rigorous dynamical model with only a doubling of computational cost. This paper presents simple model tests using the EISMINT experimental ice block, a 1500 x 1500 km ice sheet which rests on a flat bed. Ice-stream behavior is investigated for a range of coupling rules and activation scenarios. In simple tests presented here, the authors find that the viscous response time and source ice feeding the ice stream may be a factor limiting ice-stream vigor and longevity. (Auth.)

51-1886

Heinrich-scale surge oscillations as an internal property of ice sheets.

Saltzman, B., Verbitskiĭ, M.IA., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.348-351, 11 refs.

Ice sheets, Glacier flow, Glacier friction, Glacier heat balance, Glacier oscillation, Glacier surges, Basal sliding, Ice rafting, Marine deposits, Ice age theory, Mathematical models

A dynamical model governing the variations of ice-sheet volume, basal-water amount and ice-surge flux has been formulated in its simplest form, based on fundamental thermomechanical properties of ice sheets governing the basal-melting process. This model includes the effects of the geothermal flux, internal thermal advection and basal friction, the latter two factors being particularly important in regulating the bottom temperature and bringing it to the melting point, i.e. to a state vulnerable to catastrophic ice surges. It is shown that, for certain values of the unknown rate constants, such a model can exhibit oscillations on roughly the same scale as observed Heinrich events, even when external climatic changes are neglected, which would support the view that such events are an internal property of ice sheets. (Auth.)

51-1887

Isostatic uplift in the late Weichselian Barents Sea: implications for ice-sheet growth.

Siegert, M.J., Fjeldskaar, W., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.352-358, 28 refs.

Ice sheets, Glaciation, Glacial geology, Glacier oscillation, Grounded ice, Ice age theory, Marine geology, Isostasy, Sea level, Geochronology, Computerized simulation, Barents Sea

51-1888

250,000 years in the history of Greenland's ice sheet.

Weis, M., Hutter, K., Calov, R., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.359-364, 16 refs.

Ice sheets, Glacier oscillation, Glacial meteorology, Ice age theory, Paleoclimatology, Computerized simulation, Greenland

51-1889

Geometric boundary conditions for modelling the velocity field of the antarctic ice sheet.

Bamber, J.L., Huybrechts, P., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.364-373, 23 refs.

Ice sheets, Glacier flow, Glacier surfaces, Glacier thickness, Glacier oscillation, Glacier surveys, Radio echo soundings, Spaceborne photography, Computerized simulation, Antarctica

This paper presents improved geometric boundary conditions (surface elevation and ice thickness) required as inputs to calculations of the surface-velocity field for the antarctic ice sheet. A comparison of the two-dimensional horizontal velocity field obtained on the basis of conservation of mass (balance velocity) with the diagnostic velocity field calculated with an ice-sheet model (dynamic velocity) may yield information on shortcomings in the way the ice-sheet model describes the ice flow. Here, the surface-elevation grid is described in detail, as it has been generated specifically for such a study and represents a new standard in accuracy and resolution for calculating surface slopes. The digital-elevation model was generated on a 10 km grid size from over 20,000,000 height estimates obtained from eight 35 d repeat cycles of ERS-1 radar-altimeter data. For surface slopes less than 0.4°, the accuracy is better than 1.5 m. In areas of high surface slope (coastal and mountainous regions), the altimeter measurements have been supplemented with data taken from the Antarctic Digital Database. South of 81.5°, data from the SPRI folio map have been used. The ice-thickness grid was produced from a combination of a redigitization of the SPRI folio and the original radio-echo-sounding flight lines. (Auth. mod.)

51-1890

Antarctic topography and kilometre-scale roughness derived from ERS-1 altimetry.

Brisset, L., Rémy, F., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.374-381, 19 refs.

Ice sheets, Glacier surveys, Glacier surfaces, Glacier thickness, Topographic surveys, Radio echo soundings, Spaceborne photography, Antarctica

The ERS-1 satellite has delivered altimetric data since 1992, enabling the authors to map most of the antarctic ice-sheet topography south to 82°S with better precision than all previous techniques. An algorithm has been developed such that the accuracy of the height data reaches the sub-meter level. As a first step, an inverse method has been designed to map the large-scale global topography, which is of interest to the study of the ice-sheet flow dynamics. As a second step, an adapted inverse algorithm displays precisely the short-scale undulations which are controlled by the bedrock below the ice. Finally, variations in the back-scattered altimetric signal allows to map directly the kilometer-scale roughness that is related to the basal-flow conditions. Together, these maps constitute an important database for modelling the ice sheet. (Auth.)

51-1891

Polythermal modelling of steady states of the antarctic ice sheet in comparison with the real world.

Hansen, I., Greve, R., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.382-387, 10 refs.

Ice sheets, Glacier flow, Glacier friction, Glacier heat balance, Glacier mass balance, Glacier oscillation, Computerized simulation, Antarctica

An approach to simulate the present antarctic ice sheet with respect to its thermomechanical behavior and the resulting features is made with the three-dimensional polythermal ice-sheet model designed by Greve and Hutter. It treats zones of cold and temperate ice as different materials with their own properties and dynamics. This is important because an underlying layer of temperate ice can influence the ice sheet as a whole, e.g. the cold ice may slide upon the less viscous binary ice-water mixture. Measurements indicate that the geothermal heat flux below the antarctic ice sheet appears to be remarkably higher than the standard value of 42 mW/m^2 that is usually applied for Precambrian shields in ice-sheet modelling. Since the extent of temperate ice at the base is highly dependent on this heat input from the lithosphere, an adequate choice is crucial for realistic simulations. The authors present a series of steady-state results with varied geothermal heat flux and demonstrate that the real ice-sheet topography can be reproduced fairly well with a value in the range 50-60 mW/m^2. (Auth. mod.)

51-1892

Movement and structural features observed in ice masses, Framnes Mountains, Mac. Robertson Land, East Antarctica.

Marmo, B.A., Dawson, J., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.388-395, 6 refs.

Ice sheets, Glacier surveys, Glacier flow, Glacier surfaces, Crevasses, Antarctica—Framnes Mountains

Ice-movement surveys in the Framnes Mountains from austral summers 1993-94 and 1994-95 are presented with complementary surface elevations and structural interpretations. Surface velocities of 21 m/a have been recorded in Ice Stream B and 31 m/a in Ice Stream C. The flow rate varied between 11.6 and 21.0 m/a over a lateral range of 2.1 km west of Rumdoodle Peak and between 17.1 and 31.5 m/a over 2 km west of Mount Parsons. Two ice streams of relative high flow between the central Masson and David Ranges and several zones of incremental increase in flow rate have been identified within Ice Stream B, using shear-sense criteria based as ice-fracture geometry and subsequent deformation of crevasse traces. These zones of localized strain correlate with ice-flow survey measurements. (Auth.)

51-1893

Models for strain localization in Law Dome, Antarctica.

Rowden-Rich, R.J.M., Wilson, C.J.L., *Annals of glaciology,* 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.396-401, 21 refs.

Ice sheets, Glacier flow, Glacier friction, Glacier beds, Ice deformation, Ice creep, Bottom topography, Stress concentration, Computerized simulation, Antarctica—Law Dome

A finite-element model was implemented that relates the computed flow to some field and fabric observations recorded on the Law Dome ice cap, East Antarctica. The results of the model suggest that the general ice flow is markedly affected by the bedrock topography. The zones of measured anomalous flow correlate with significant changes in the modelled stress within the ice mass. Stress increases of up to 50% above the reduced model shear stress were obtained in the models where the ice moved over a bedrock rise. Stress relaxation also occurs in the ice mass as the ice moves downward to a lee depression. There is a marked oscillation in the direction of principal stress and this is responsible for the progressive development of a set of high stress zones that are superimposed on the down-slope ice movement. (Auth.)

51-1894

Photoplastic effect on ice.

Khusnatdinov, N.N., Petrenko, V.F., Microstructure of irradiated materials, Vol.373. Proceedings of a symposium, Nov. 29-Dec. 1, 1995, Boston, MA, edited by I.M. Robertson, L.E. Rehn, S.J. Zinkle, and W.J. Pythian, Pittsburgh, PA, Materials Research Society, 1995, p.317-322, 25 refs. For earlier research on this topic see 48-4812.

DLC TA418.6.M49 1995

Photochemical reactions, Ice plasticity, Ice composition, Plastic deformation, Glacier flow

51-1895

Interruptability robustness and dynamic contingency management model.

Wade, J.W., Automatic control, World Congress. Proceedings of the 12th Triennial World Congress of the International Federation of Automatic Control, Sydney, Australia, 18-23 July 1993, Vol. 4, edited by G.C. Goodwin and R.J. Evans, [London], Elsevier, 1994, p.447-450, 7 refs.

DLC TJ212.2.I58 1993b vol.4

Stations, Cold weather construction, Models, Safety, Hydraulic structures, Antarctica

Assembly interruptability is a problem of increasing concern for construction projects which take place in hazardous environments. Interruptability is the susceptibility and resiliency of a project to an unplanned interruption of the assembly process. When the assembly process takes place in a hazardous environment, such as space, undersea, or Antarctica, interruptions may jeopardize the survival of the structure being assembled, or the safety of the members of the construction crew. This paper presents a methodology to solve the interruptability problem and provides a dynamic contingency manager for assembly projects in a hazardous environment. The model was applied to the present problem of interruptability during the assembly of the United States Space Station Freedom. However, the general nature of the model allows it to be applied to other space construction projects such as the lunar base and orbital assembly of the manned Mars spacecraft, as well as earth-based construction projects such as undersea laboratories, antarctic bases, skyscrapers, etc. The Interruptability Robustness Model sets forth a solution to the interruptability problem and at the same time can provide a dynamic, contingency management system. (Auth. mod.)

51-1896

Water resources data for Alaska, water year 1995.

Schellekens, M.F., Linn, K.R., Bigelow, B.B., Shaw, S.K., Hiner, M.M., *U.S. Geological Survey. Water Resources Division. Water-data report,* July 1996, AK-95-1, 278p., PB96-197298, Includes a list of publications on techniques of water resources investigations, p.38-41.

Water reserves, Surface waters, River flow, Stream flow, Ground water, Water chemistry, Water level, Water table, Suspended sediments, United States—Alaska

51-1897

In-situ electronic sensors to determine analytes in cold-regions soils.

Brundage, G., MP 3925, Reno, NV, Phionics, Inc., 1995, 16p., ADA-302 860, 4 refs. Funded by U.S. Army Cold Regions Research and Engineering Laboratory under Contract No.DACA39-95-C-0029.

Tundra soils, Soil pollution, Frozen ground chemistry, Soil chemistry, Soil analysis, Soil microbiology, Land reclamation, Electrical logging

51-1898

***Ice and construction* edited by L. Makkonen.**

Jones, K.F., Richter-Menge, J.A., Sodhi, D.S., Andreas, E.L., MP 3926, *Royal Meteorological society. Quarterly journal A,* Apr. 1996, 122(531), p.792-793, 6 refs. For book being reviewed see 50-399.

Ice (construction material), Ice strength

51-1899

Investigation for icing on overhead transmission line conductor. [Sodensen no chakuhyo ni kansuru kenkyu]

Takagi, S., *Denryoku chuo kenkyujo Gijutsu kenkyujo shoho (Central Research Institute of Electric Power Industry. Technical Laboratory. Journal),* [1963], 13(5,6), p.41-114, In Japanese with English summary and captions. 35 refs.

Power line icing, Ice accretion, Ice loads, Ice forecasting, Glaze, Snowstorms, Meteorological factors, Mathematical models

51-1900

Review of the friction of snow.

Colbeck, S.C., MP 3927, Physics of sliding friction, Dordrecht, Netherlands, Kluwer Academic Publishers, 1996, p.275-291, 42 refs. Presented at a NATO Advanced Research Workshop and Adriatico Research Conference, Miramare, Trieste, Italy, June 20-23, 1995.

DLC QC197.A27 1995

Wood snow friction, Plastics snow friction, Snow surface, Water films, Skis, Sliding

Snow friction results from a mixture of processes, depending on the amount of meltwater present. With little meltwater, the surfaces are partially separated; with too much water, the contact area increases and there may be capillary attachments. Heat is generated by friction and solar radiation absorption at the interface and is conducted away by both slider and ice particles. The remaining heat is available to generate meltwater which acts as a lubricant. The important processes operate at the ski base temperature that is highly dependent on such things as snow-surface temperature, load and speed. Electrical charges are generated but are drained away quickly on most surfaces. The roughness elements, film thicknesses and contact areas must be characterized better before the basic processes can be understood further.

51-1901

Sliding of glaciers.

Nye, J.F., Physics of sliding friction, Dordrecht, Netherlands, Kluwer Academic Publishers, 1996, p.293-298, 6 refs. Presented at a NATO Advanced Research Workshop and Adriatico Research Conference, Miramare, Trieste, Italy, June 20-23, 1995.

DLC QC197.A27 1995

Glacier flow, Glacier friction, Glacier beds, Basal sliding, Regelation, Ice creep

51-1902

Proceedings.

International Symposium on Global Change (IGBP), Tokyo, Mar. 27-29, 1992, Tokyo, Waseda University, [1994], 781p., DE94-765351, Refs. passim. Organized by the Japan National Committee for the International Geosphere-Biosphere Programme (IGBP). For selected papers see 51-1903 through 51-1917.

Global change, Global warming, Paleoclimatology, Atmospheric circulation, Atmospheric composition, Plant ecology, Vegetation patterns

51-1903

Measurements of atmospheric CO_2 and CH_4 at Japanese antarctic station, Syowa.

Aoki, S., Kawaguchi, S., Nakagawa, T., Japan National Committee for the International Geosphere-Biosphere Programme. International Symposium on Global Change (IGBP), Tokyo, Mar. 27-29, 1992. Proceedings, Tokyo, Waseda University, [1994], p.44-67, DE94-765351, 29 refs.

Polar atmospheres, Atmospheric composition, Atmospheric circulation, Air pollution, Geochemical cycles, Global change, Antarctica—Showa Station

Continuous measurements of the major greenhouse gases, CO_2 and CH_4, have been made at Showa Station since 1984 and 1988, respectively. The average annual increase of CO_2 concentration over the last 5 years was 1.6 ppmv/yr. The secular CO_2 trend showed a slow increase in 1984, 1986 and 1988 and rapid increase in 1985 and 1987, which may be related to the 1988/1987 ENSO event. The average seasonal CO_2 cycle showed minimum and maximum concentrations in mid-April and early October, respectively, and its peak-to-peak amplitude was about 1.1 ppmv. There was no indication of a long-term increase or decrease in the amplitude during the seasonal cycle. The average seasonal CH_4 variation showed minimum and maximum concentrations in early Mar. and late Sep., respectively, and a peak-to-peak amplitude of 30 ppbv. The average increase rate of the CH_4 concentration was 10.2 ppbv/yr for the period 1988-1990. (Auth. mod.)

51-1904

Vertical transport of organic matter in the various oceanic areas.

Handa, N., Hayakawa, K., Japan National Committee for the International Geosphere-Biosphere Programme. International Symposium on Global Change (IGBP), Tokyo, Mar. 27-29, 1992. Proceedings, Tokyo, Waseda University, [1994], p.298-304, DE94-765351, 10 refs.

Oceanographic surveys, Sea water, Water chemistry, Suspended sediments, Marine biology, Plankton, Nutrient cycle, Biomass, Antarctica—Breid Bay, Japan—Hokkaido

Vertical flux of organic matter was determined in Breid Bay, Antarctica, and Hidaka Trough off Hokkaido, Japan. Fatty acid, $^{13}C/^{12}C$, and $^{14}C/^{13}C$ of the organic matter of the sinking particles were determined and it was found that the ratio of unsaturated to saturated fatty acid, and $\delta^{13}C$ were valuable tools to diagnose phytoplankton growth in the surface and subsurface waters. In addition to this, $\Delta^{14}C$ gave an indication of lateral transport of organic matter in the continental shelf and its slope areas. (Auth. mod.)

51-1905

Ecophysiological responses of the northern tree species in Japan to elevated CO_2 concentrations and temperature.

Koike, T., Japan National Committee for the International Geosphere-Biosphere Programme. International Symposium on Global Change (IGBP), Tokyo, Mar. 27-29, 1992. Proceedings, Tokyo, Waseda University, [1994], p.425-430, DE94-765351, 26 refs.

Plant ecology, Plant physiology, Trees (plants), Vegetation patterns, Acclimatization, Phenology, Atmospheric composition, Carbon dioxide, Global warming, Japan

51-1906

Potential effects of global change on the functioning and carbon balance of arctic ecosystems.

Oechel, W.C., Japan National Committee for the International Geosphere-Biosphere Programme. International Symposium on Global Change (IGBP), Tokyo, Mar. 27-29, 1992. Proceedings, p.431-469, DE94-765351, 74 refs.

Polar atmospheres, Atmospheric composition, Soil air interface, Tundra climate, Tundra soils, Tundra vegetation, Forest ecosystems, Plant ecology, Plant physiology, Vegetation patterns, Biomass, Nutrient cycle, Global warming

51-1907

Effects of global climatic warming on vegetation differentiation with special reference to subarctic vegetation of central Yukon Territory, Canada.

Kojima, S., Japan National Committee for the International Geosphere-Biosphere Programme. International Symposium on Global Change (IGBP), Tokyo, Mar. 27-29, 1992. Proceedings, Tokyo, Waseda University, [1994], p.512-518, DE94-765351, 16 refs.

Plant ecology, Vegetation patterns, Desiccation, Forest tundra, Tundra vegetation, Forest ecosystems, Global warming, Computerized simulation, Canada—Yukon Territory

51-1908

Black snow in Kashmir due to Gulf War.

Kawosa, M.A., Japan National Committee for the International Geosphere-Biosphere Programme. International Symposium on Global Change (IGBP), Tokyo, Mar. 27-29, 1992. Proceedings, Tokyo, Waseda University, [1994], p.586-594, DE94-765351.

Snowfall, Snow composition, Snow impurities, Atmospheric circulation, Air pollution, Scavenging, Kashmir

51-1909

Last glacial paleoenvironments in the eastern Asia.

Ono, Y., Japan National Committee for the International Geosphere-Biosphere Programme. International Symposium on Global Change (IGBP), Tokyo, Mar. 27-29, 1992. Proceedings, Tokyo, Waseda University, [1994], p.595-598, DE94-765351, 2 refs.

Paleoclimatology, Permafrost distribution, Snow line

51-1910

Palaeomonsoon in northern China during the last 20000 years.

An, Z.S., Zhou, W.J., Japan National Committee for the International Geosphere-Biosphere Programme. International Symposium on Global Change (IGBP), Tokyo, Mar. 27-29, 1992. Proceedings, Tokyo, Waseda University, [1994], p.624-635, DE94-765351, 10 refs.

Atmospheric circulation, Precipitation (meteorology), Paleoclimatology, Loess, Eolian soils, Desert soils, Steppes, Meadow soils, Soil dating, Soil formation, Global warming, China

51-1911

History of straits around the Japanese islands in the late Quaternary.

Ohshima, K., Japan National Committee for the International Geosphere-Biosphere Programme. International Symposium on Global Change (IGBP), Tokyo, Mar. 27-29, 1992. Proceedings, Tokyo, Waseda University, [1994], p.654-664, DE94-765351.

Marine geology, Sea level, Paleoclimatology, Paleoecology, Geochronology, Japan

51-1912

Late Quaternary paleoenvironments of the Japan Sea: a tephrochronological and sedimentological study.

Ikehara, K., Kikkawa, K., Katayama, H., Seto, K., Japan National Committee for the International Geosphere-Biosphere Programme. International Symposium on Global Change (IGBP), Tokyo, Mar. 27-29, 1992. Proceedings, Tokyo, Waseda University, [1994], p.676-692, DE94-765351, 39 refs.

Geological surveys, Marine geology, Marine deposits, Bottom sediment, Quaternary deposits, Paleoecology, Paleoclimatology, Global change, Sea level, Volcanic ash, Drill core analysis, Stratigraphy, Soil dating, Geochronology, Japan, Sea

51-1913

Evolution of the southwest monsoon in China after the last glaciation.

Pu, Q.Y., Japan National Committee for the International Geosphere-Biosphere Programme. International Symposium on Global Change (IGBP), Tokyo, Mar. 27-29, 1992. Proceedings, Tokyo, Waseda University, [1994], p.706-711, DE94-765351, 7 refs.

Atmospheric circulation, Precipitation (meteorology), Paleoclimatology, Geochronology, Glaciation, Glacial meteorology, Global change, China

51-1914

Possible cause of the climatic cooling between the Cretaceous and Cenozoic periods.

Tachibana, Y., Japan National Committee for the International Geosphere-Biosphere Programme. International Symposium on Global Change (IGBP), Tokyo, Mar. 27-29, 1992. Proceedings, Tokyo, Waseda University, [1994], p.712-719, DE94-765351, 9 refs.

Paleobotany, Vegetation patterns, Vegetation factors, Paleoclimatology, Radiation balance, Global change, Ice age theory

51-1915

Climate change reconstructed from historical data in Japan.

Tagami, Y., Japan National Committee for the International Geosphere-Biosphere Programme. International Symposium on Global Change (IGBP), Tokyo, Mar. 27-29, 1992. Proceedings, Tokyo, Waseda University, [1994], p.720-729, DE94-765351, 16 refs.

Climatic changes, Paleoclimatology, Meteorological data, Statistical analysis, Japan

51-1916

Paleoenvironmental research in China corresponding with the study of global change.

Zheng, K.Y., Japan National Committee for the International Geosphere-Biosphere Programme. International Symposium on Global Change (IGBP), Tokyo, Mar. 27-29, 1992. Proceedings, Tokyo, Waseda University, [1994], p.754-759, DE94-765351.

Research projects, Paleoclimatology, Global change, China

51-1917

Climatic changes in the north China plain since 20 KA B.P.

Tong, G.B., Japan National Committee for the International Geosphere-Biosphere Programme. International Symposium on Global Change (IGBP), Tokyo, Mar. 27-29, 1992. Proceedings, Tokyo, Waseda University, [1994], p.776-781, DE94-765351, 7 refs.

Paleobotany, Paleoclimatology, Palynology, Plant ecology, Vegetation patterns, Steppes, Soil dating, Geochronology, Climatic changes, China

51-1918

Collaborative research on the Northeast Water Polynya: NEWP92 hydrographic data report. USCGC *Polar Sea* cruise, July 15-August 15, 1992.

Wallace, D.W.R., et al, Upton, NY, Brookhaven National Laboratory, June 1995, n.p., DE95-014644, 16 refs.

Polynyas, Sea ice distribution, Oceanographic surveys, Sea water, Water temperature, Water pressure, Water chemistry, Salinity, Sounding, Data processing, Statistical analysis, Greenland Sea

51-1919

Wind tunnel and outdoor physical modelling of the entrainment of snow by the wind. [Modélisation physique en soufflerie et à l'extérieur du transport de neige par le vent]

Naaim-Bouvet, F., Naaim, M., *La houille blanche,* 1995, No.7, p.68-75, In French. 21 refs. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Snow air interface, Blowing snow, Snowdrifts, Snow erosion, Wind erosion, Wind tunnels, Mathematical models

51-1920

Study of the factors influencing the entrainment of snow by the wind based upon concentration profiles. [Étude des facteurs influençant le transport de neige par le vent à partir des profils de concentration]

Martinez, H., Naaim, M., *La houille blanche,* 1995, No.7, p.76-82, In French. 11 refs. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Snow air interface, Blowing snow, Snowdrifts, Snow erosion, Wind erosion, Particle size distribution, Mathematical models

51-1921

Responses of an alpine fissured aquifer to melting snow at Morzine-Avoriaz, Haute-Savoie. [Réponses d'un aquifère fissuré de haute montagne à la fusion nivale Morzine-Avoriaz, Haute-Savoie]

Lhomme, D., Dzikowski, M., Nicoud, G., Naffrechoux, E., *La houille blanche,* 1995, No.7, p.83-87, In French. 12 refs. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

River basins, Snow hydrology, Snowmelt, Snow heat flux, Runoff forecasting, Statistical analysis, France—Alps

51-1922

Modelling of winter climatology in the French Alps and application to the impact of climate change. [Modélisation de la climatologie nivale des Alpes françaises et application aux études d'impact des changements du climat]

Martin, E., Brun, E., Durand, Y., *La houille blanche,* 1995, No.7, p.88-93, In French. 7 refs. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Snow cover distribution, Snow depth, Snow cover effect, Snow heat flux, Snow air interface, Atmospheric circulation, Global warming, Computerized simulation, France—Alps

51-1923

Modelling of the Greenland ice cap: sensitivity test and development experiment using a new 3D model. [Modélisation de la calotte du Groenland: tests de sensibilité et expérience d'évolution avec un nouveau modèle 3D]

Fabre, A., Letreguilly, A., Ritz, C., Mangeney, A., *La houille blanche,* 1995, No.7, p.94-99, In French. 9 refs. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Ice sheets, Glacier oscillation, Glacier thickness, Glacier mass balance, Glacier flow, Glacier friction, Glacial meteorology, Global warming, Computerized simulation, Mathematical models, Greenland

51-1924

Statistical methods for determining the maximum stopping distance of avalanches. [Méthodes statistiques pour la détermination de la distance d'arrêt maximale des avalanches]

Adjel, G., *La houille blanche,* 1995, No.7, p.100-104, In French. 6 refs. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Avalanche modeling, Avalanche mechanics, Avalanche tracks, Avalanche deposits, Statistical analysis, Mathematical models

51-1925

ANENA, an organization for snow and avalanche safety. [L'ANENA, un organisme au service de la sécurité "neige et avalanches"]

De Crécy, L., Sivardière, F., *La houille blanche,* 1995, No.5/6, p.39-43, In French. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Avalanche forecasting, Organizations, Research projects, Safety, France

51-1926

Forecasting avalanche risk in France—review and prospects. [La prévision du risque d'avalanches en France—Bilan et perspectives]

Pahaut, E., Giraud, G., *La houille blanche,* 1995, No.5/6, p.44-49, In French. 15 refs. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Avalanche forecasting, Snow cover stability, Safety, Data processing, France

51-1927

Investigation of the spatial distribution of the effects of snow carried by the wind—initial results of systematic measurements in situ. [Étude de la répartition spatiale des effets du transport de neige par le vent; premiers travaux réalisés à partir de mesures systématiques sur le terrain]

Mases, M., Buisson, L., Good, W., Vilaplana, J.M., *La houille blanche,* 1995, No.5/6, p.50-55, In French with English summary. 6 refs. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Snow accumulation, Snow cover distribution, Snowdrifts, Snow erosion, Wind erosion, Switzerland

51-1928

Numerical modeling of aerosol avalanches. [Modélisation numérique des avalanches aérosols]

Naaim, M., *La houille blanche,* 1995, No.5/6, p.56-62, In French. 8 refs. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Avalanche modeling, Avalanche mechanics, Turbulent flow, Mathematical models

51-1929

Modeling snow cover on different scales. Application to avalanches, hydrology and climate. [Modélisation du manteau neigeux à différentes échelles. Application au domaine des avalanches, de l'hydrologie et du climat]

Brun, E., Martin, E., *La houille blanche,* 1995, No.5/6, p.63-68, In French. 15 refs. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Snow hydrology, Snow air interface, Snow accumulation, Snow cover stability, Avalanche forecasting, Computerized simulation, France

51-1930

Use of imaging techniques for velocity mapping on the surface of a dense avalanche. [Utilisation des techniques d'imagerie pour la cartographie des vitesses à la surface d'une avalanche dense]

Granada, F., Marco, O., Villemain, P., *La houille blanche,* 1995, No.5/6, p.69-75, In French. 13 refs. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Avalanche modeling, Avalanche mechanics, Image processing

51-1931

Monitoring water resources from melted snow. [Contrôle des ressources hydrauliques par fusion nivale]

Martinez, R., Arenillas, M., Pedrero, A., Cantarino, I., Ferrer, C., *La houille blanche,* 1995, No.5/6, p.76-82, In French. 6 refs. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Snow hydrology, Snowmelt, Runoff forecasting, Water reserves, Spain

51-1932

Volumetric changes in the Sarennes Glacier (Isère)—Period 1906-1991. [Variations volumétriques du glacier de Sarennes (Isère)—Période 1906-1991]

Valla, F., Berger, F., Piedallu, C., *La houille blanche,* 1995, No.5/6, p.83-91, In French. 10 refs. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Mountain glaciers, Glacier surveys, Glacier oscillation, Glacier mass balance, Ice volume, France

51-1933

Remote measurement of snow depth and the prediction of input to EDF reservoirs. [La télénivométrie et la prévision des apports de remplissage des réservoirs EDF]

Tourasse, P., *La houille blanche,* 1995, No.5/6, p.92-97, In French. 5 refs. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Snow surveys, Snow cover distribution, Snow depth, Snow hydrology, Snowmelt, Runoff forecasting, Water reserves, Reservoirs, Spaceborne photography, France

51-1934

Polar ice: rapid change in the climate. [Glaces polaires: variations rapides du climat]

Jouzel, J., Lorius, C., *La houille blanche,* 1995, No.5/6, p.98-103, In French. 29 refs. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Ice sheets, Glaciation, Glacier oscillation, Glacial meteorology, Ice cores, Ice dating, Global change, Paleoclimatology, Greenland, Antarctica—Vostok Station

Ice core records of the last 140,000 years from Summit in Greenland and Vostok in Antarctica are compared. Climatic changes appear more often and more rapidly in the Greenland than the Vostok record, but warming or cooling periods lasting more than 2000 years in the Greenland record usually appear later and less pronounced in the Vostok record. It is suggested that we are now in an interglacial period in the arctic likely to be followed by an interglacial period in the antarctic.

51-1935

Sensitivity of glacier mass balance to climate change. [Sensibilité des bilans de masse glaciaires aux fluctuations climatiques]

Vallon, M., Vincent, C., Reynaud, L., *La houille blanche,* 1995, No.5/6, p.104-108, In French. 17 refs. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Mountain glaciers, Glacial meteorology, Glacier mass balance, Glacier oscillation, Global warming

51-1936

Main results of 100 years of research at the Vergtferner, Oetztal, Austria. [Les résultats principaux de 100 ans de recherche au Vernagtferner, Oetztal (Autriche)]

Braun, L.N., *La houille blanche,* 1995, No.5/6, p.109-110, With French title. 8 refs. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Mountain glaciers, Glacier surveys, Glacier oscillation, Glacier mass balance, Meltwater, Austria

51-1937

Polar ices chemistry: a past atmosphere reflection.

Legrand, M., Delmas, R., *La houille blanche,* 1995, No.5/6, p.116-122, With French summary. 41 refs. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Ice cores, Glacial meteorology, Glacier ice, Ice composition, Ice dating, Impurities, Polar atmospheres, Atmospheric composition, Air pollution, Global change, Paleoclimatology, Greenland, Antarctica

A general review is presented of studies on impurities in ice cores from Greenland and Antarctica. Sulfate levels have increased over the last 200 years in both Greenland and Antarctica, at a faster rate in Greenland apparently due to increased burning of fossil fuels at high and mid northern latitudes, but with occasional peaks in Antarctica corresponding to volcanic eruptions elsewhere in the world. Despite the apparent increase of sulfates in recent decades, the Vostok ice core indicates that over the last 220,000 years, MSA (methanesulfonate) concentrations have been higher in colder periods. Sea salt and dust concentrations in both the Greenland and antarctic ice cores are higher in glacial than in warmer periods, likely due to strong winds.

51-1938

Polar ice: a note on the changes affecting greenhouse gases. [Les glaces polaires: une mémoire de l'évolution des gaz à effet de serre]

Raynaud, D., Barnola, J.M., Chappellaz, J., *La houille blanche,* 1995, No.5/6, p.123-125, In French. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Ice cores, Ice composition, Atmospheric composition, Paleoclimatology, Global warming

A brief summary is given of the concentrations of carbon dioxide and methane in the atmosphere as recorded in ice cores from Greenland and Antarctica for the last two centuries and in particular, from the Vostok ice core for the last 150,000 years. Until about 1850 as recorded in the Vostok ice core, the CO_2 concentration has fluctuated between about 200 and 300 ppm, and the CH_4 concentration has fluctuated between about 300 and 700 ppb. Since 1850 worldwide, the CO_2 concentration has increased to its present value of 350 ppm, and the CH_4 concentration has increased to 1700 ppb.

51-1939

Snow and glaciers in the Italian Alps: a century of research. [Neige et glaciers dans les Alpes italiennes: un siècle de recherche]

Mercalli, L., Mortara, G., Rossi, G.C., Smiraglia, C., *La houille blanche,* 1995, No.5/6, p.126-133, In French. 150 refs. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Snowfall, Snow cover distribution, Avalanches, Avalanche forecasting, Glacier oscillation, Glacial meteorology, Glacial hydrology, Research projects, Bibliographies, Italy—Alps

51-1940

Mechanical behavior of glacier ice. [Comportement mécanique des glaces de glaciers]

Castelnau, O., Duval, P., *La houille blanche,* 1995, No.5/6, p.134-138, In French. 25 refs. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Ice sheets, Glacier flow, Glacier friction, Ice structure, Ice deformation, Ice creep, Recrystallization, Computerized simulation

Models of the flow velocity and deformation of ice sheets, particularly in Antarctica and Greenland, are discussed. The models discussed include the VPSC (viscoplastic self-coherent) model, the Taylor homogeneous deformation model, and the homogeneous confined static model. The Vostok ice core indicates a vertical strain rate on the order of 2.5×10^{-13}/s. Data from both Greenland and Antarctica indicate that the recrystallization rate of grain size enlargement is 10^{-17} m^2/s at -50°C and 10^{-15} m^2/s at -10°C. In the models discussed, deformation is simulated at a strain rate of 10^{-7}/s and a temperature of -10°C.

51-1941

Glacier mass balance studies in the Swiss Alps.

Aellen, M., *La houille blanche,* 1995, No.5/6, p.139-143, With French summary. 43 refs. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Mountain glaciers, Glacier surveys, Glacier oscillation, Glacier mass balance, Statistical analysis, Switzerland

51-1942

Internal structure of the active rock glacier of Las Argualas (Aragon Pyrenees, Spain). [Structure interne du glacier rocheux actif de Las Argualas (Pyrénées aragonaises, Espagne)]

Fabre, D., *La houille blanche,* 1995, No.5/6, p.144-147, In French. 7 refs. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Rock glaciers, Glacier surveys, Glacier flow, Glacier beds, Ground ice, Fossil ice, Radio echo soundings, Electromagnetic prospecting, Spain—Pyrenees

51-1943

Glaciology and civil engineering. [Glaciologie et génie civil]

Plé, O., Meyssonnier, J., Weiss, J., Fiorio, B., *La houille blanche,* 1995, No.5/6, p.148-153, In French. 16 refs. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Ice solid interface, Ice cover strength, Ice loads, Ice friction, Ice pressure, Ice deformation, Bridges, Offshore structures, Design criteria

51-1944

Wind-swept snow concentration profiles: theory, digital resolution and in-situ experimental validation. [Profils de concentration de la neige soufflée: théorie, résolution numérique et validation expérimentale in situ]

Naaim-Bouvet, F., Naaim, M., Martinez, H., *La houille blanche,* 1996, No.5, p.53-57, In French. 10 refs. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Blowing snow, Snowdrifts, Snow erosion, Wind erosion, Particle size distribution, Statistical analysis

51-1945

Modeling of snow's reflectance from visible to near infrared. Comparison with laboratory measurements and in-situ measurements. [Modélisation de la réflectance de la neige du visible au proche infrarouge. Comparaison avec des mesures en laboratoire et des mesures in situ]

Leroux, C., Lenoble, J., Sergent, C., Deuzé, J.L., Goloub, P., *La houille blanche,* 1996, No.5, p.58-61, In French. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Snow optics, Snow cover structure, Snow impurities, Albedo, Computerized simulation

51-1946

Modeling of the polar snow cover. [Modélisation du manteau neigeux polaire]

Dang, H., Genthon, C., Martin, E., *La houille blanche,* 1996, No.5, p.62-65, In French. 11 refs. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Snow air interface, Snow heat flux, Snow cover structure, Snow stratigraphy, Metamorphism (snow), Meteorological data, Meteorological factors, Computerized simulation, Antarctica—Amundsen-Scott Station

A general discussion is presented of using the CROCUS snow model, originally developed at the Centre d'Études de la Neige (Snow Studies Center) in Saint-Martin-d'Hères, France, for avalanche forecasting, to simulate the evolution and atmospheric interaction of the snow cover at the South Pole. The model was tested with meteorological data from automatic weather stations in Antarctica archived at the European Centre for Medium-Range Weather Forecasts in Reading, England. The meteorological parameters of the model include air temperature, relative humidity, wind velocity, direct and diffuse incident solar radiation, incident infrared radiation, cloudiness, and quantity and type of precipitation. The model appears promising for applications in Antarctica.

51-1947

Hydrometeorological survey of the Sarennes basin. Presentation of project and initial results. [Étude hydrométéorologique du Bassin de Sarennes. Présentation du projet et premiers résultats]

Martin, E., et al, *La houille blanche,* 1996, No.5, p.66-70, In French. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Mountain glaciers, Glacier surveys, Glacier mass balance, Glacial hydrology, Meltwater, Runoff forecasting, Computerized simulation, France—Alps

51-1948

Operational forecast of supply from Durance to Serre-Ponçon by means of MORDOR model. Balance for the year 1994-1995. [Prévision opérationnelle des apports de la Durance à Serre-Ponçon à l'aide du modèle MORDOR. Bilan de l'année 1994-1995]

Garçon, R., *La houille blanche,* 1996, No.5, p.71-76, In French. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Snow hydrology, Snowmelt, River basins, Stream flow, Water balance, Runoff forecasting, Computerized simulation, France

51-1949

Summary of glaciological and snow data in Spain, 1994-95 season. [Résumé des données glaciologiques et nivologiques en Espagne, saison 1994-95]

Martínez, R., Cantarino, I., *La houille blanche,* 1996, No.5, p.77-79, In French. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Glacier surveys, Glacial hydrology, Glacier mass balance, Water reserves, Spain

51-1950

Water balance in the basin of the Caresèr (central Alps) during the three years 1992-95. [Bilans hydrologiques du bassin versant du glacier de Caresèr (Alpes Centrales) au cours des trois années 1992-95]

Rossi, G.C., Zanon, G., *La houille blanche,* 1996, No.5, p.79-84, In French. 10 refs. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Mountain glaciers, Glacier surveys, Glacier mass balance, Glacial hydrology, Meltwater, Runoff, Water balance, Italy—Alps

51-1951

Glacier/rock glacier relationship in Valtellina (Italy): results of the 1992-1994 surveys. [Les relations glacier-glacier rocheux en Valteline (Italie): résultats des campagnes de mesures 1992-1994]

Smiraglia, C., Assier, A., Fabre, D., Evin, M., *La houille blanche,* 1996, No.5, p.84-85, In French. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Glacier surveys, Rock glaciers, Ground ice, Italy—Alps

51-1952

Ciardoney Glacier (Gran Paradiso), mass balance 1994/1995: correlation test with the air temperature. [Glacier Ciardoney (Grand Paradis), bilan de masse 1994/1995: essai d'une corrélation avec la température de l'air]

Mercalli, L., Paludi, S., *La houille blanche,* 1996, No.5, p.85-87, In French. 2 refs. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Mountain glaciers, Glacier mass balance, Glacial meteorology, Air temperature, Statistical analysis, Italy—Alps

51-1953

Mass balance of the Sarennes Glacier, 47th season, 1994-1995. [Bilan de masse du glacier de Sarennes 47ème saison 1994-1995]

Valla, F., *La houille blanche,* 1996, No.5, p.87-92, In French. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.

Mountain glaciers, Glacier surveys, Glacier mass balance, Glacial meteorology, Glacier alimentation, Glacier ablation, Precipitation (meteorology), Air temperature, France—Alps

51-1954
Variations of Swiss glaciers in 1994/95: preliminary report. [Les variations des glaciers suisses en 1994/95: rapport préliminaire]
Aellen, M., *La houille blanche,* 1996, No.5, p.92-95, In French. Presented at Colloque Glaciologie et nivologie: état des recherches et connaissances à la fin du XXè siècle (Symposium on Glaciology and Snow Science: State of the Art at the End of the 20th Century), Grenoble, France, Feb. 15-16, 1995.
Mountain glaciers, Glacier surveys, Glacier oscillation, Statistical analysis, Switzerland

51-1955
Ice atlas—Hudson Bay and approaches. [Atlas des glaces baie d'Hudson et ses abords]
Markham, W.E., Ottawa, Environment Canada, Atmospheric Environment Service, Ice Centre, 1988, 123p., Parallel English and French texts. 21 refs.
Ice surveys, Sea ice distribution, Ice conditions, Ice edge, Icebergs, Canada—Hudson Bay

51-1956
On impact of antarctic stratospheric ozone depletion on tropospheric trace gases.
IUrganov, L.N., Radionov, V.F., Karol, I.L., Ozolin, IU.E., *Journal of ecological chemistry,* 1993, No.1, p.85-92, 21 refs.
Ozone, Atmospheric composition, Mathematical models, Stratosphere, Photochemical reactions, Antarctica—Mirnyy Station, Antarctica—Weddell Sea
Results of total column ozone and carbon monoxide optical measurements at Mirnyy Station in 1976-1991, as well as surface atmospheric concentrations observed over the Weddell Sea have been compared to values calculated with the 1-D model. During the spring months the amount of CO decreases as a result of reaction with hydroxyl, the concentration of which increases with UV solar radiation. The observed and calculated data show that CO concentration is profoundly affected by the total content of ozone (the main UV absorber) during the illuminated period of the year. As a result of this dependence, the stratospheric ozone depletion observed in the Antarctic could cause a negative trend of CO and a positive trend of OH. This dependence has to be taken into account in considering the trends of other atmospheric gases, especially in the Southern Hemisphere. An attempt to compose a model for diurnal variations of ozone concentration, observed in the surface layer over the Weddell Sea, failed. It is suggested that some unknown trace substances of marine origin take part in photochemical ozone production and destruction in the antarctic spring troposphere. (Auth.)

51-1957
Enhanced-resolution ERS-1 scatterometer imaging of southern-ocean sea ice.
Drinkwater, M.R., Long, D.G., Early, D.S., *ESA journal,* 1993, 17(4), p.307-322, 9 refs.
DLC TL787.E88c
Imaging, Image processing, Sea ice distribution, Spaceborne photography, Remote sensing, Resolution, Scattering, Antarctica
A new method of image reconstruction is described which allows enhanced-resolution images to be produced from gridded C-band scatterometer data from the Active Microwave Instrument (AMI) carried by ESA's ERS-1 satellite. Resulting images are weekly averages which improve the nominal resolution of 50 km to an enhanced resolution of approximately 14 km. Time-integrated images are maps of the mean radar-backscatter coefficient normalized to 40° incidence. Such medium-scale images are derived for application to mapping the dynamics of the southern ocean sea-ice cover. These all-weather day and night images may be derived in regions of the globe from AMI scatterometer-mode data where higher resolution (25 m) AMI SAR image data are unavailable due to the lack of a local SAR receiving station, or during periods when the receiving station is closed. Results demonstrate that this enhanced-resolution imaging technique applied to the scatterometer mode of the AMI complements and considerably enhances the lower frequency temporal and spatial coverage of high-resolution SAR images in the Antarctic. (Auth.)

51-1958
Scientific report of Fourth Indian Scientific Expedition to Antarctica.
India. Department of Ocean Development, New Delhi, India, 1987, 208p., Technical publication No.4, Refs. passim. For individual papers see A-56485, B-56481 through B-56483, E-56474, E-56478, F-56476, F-56477, F-56479, G-56486 through G-56488, I-56480, J-56484, L-56473, L-56475 or 51-1959 through 51-1967.
DLC G850.I53I53 1984
Low temperature research, Research projects, Expeditions
This technical report gives the details of the work carried out, by members of the Fourth Indian Scientific Expedition to Antarctica during 1984-1985, in the following disciplines: geology, geophysics, meteorology, biology and oceanography. Sixteen papers are included, the last 4 dealing with history of Maitri Station, fire resistant paint, polymer chemistry and renewable energy systems, respectively.

51-1959
Bedrock elevation studies in Queen Maud Land, Antarctica.
Bhattacharya, B.B., Majumdar, T.J., Scientific report of Fourth Indian Scientific Expedition to Antarctica, Technical publication No.4, New Delhi, India, Department of Ocean Development, 1987, p.35-41, 12 refs.
DLC G850.I53I53 1984
Ice shelves, Magnetic anomalies, Bedrock, Topographic surveys, Antarctica—Queen Maud Land
A magnetic anomaly map prepared from the MAGSAT data over the Ross Ice Shelf has been correlated with the available bedrock elevation data to develop a model which has been subsequently used to generate the bedrock elevation data in Queen Maud Land region of Antarctica. The results are in agreement with some control data available from the Queen Maud Land region. (Auth.)

51-1960
Magnetic survey over the ice-shelf around the Indian permanent station in Antarctica.
Verma, S.K., Mital, G.S., Rambabu, H.V., Venkatarayudu, M., Srinathareddy, K.N., Scientific report of Fourth Indian Scientific Expedition to Antarctica, Technical publication No.4, New Delhi, India, Department of Ocean Development, 1987, p.55-67, 10 refs.
DLC G850.I53I53 1984
Ice shelves, Magnetic surveys, Geomagnetism, Bottom topography, Profiles, Antarctica—Dakshin Gangotri Station
The results presented here relate to the magnetic investigations carried out around the Dakshin Gangotri Station on the ice shelf during the Fourth Indian Antarctic Expedition. Magnetic measurements were made along a 33 km long N-S traverse starting right from the northern edge of the shelf to the region where deep water channels occur. The observed profile was interpreted using a number of geophysical methods. Utilizing the magnetic data obtained in earlier surveys it has been possible to delineate sub-shelf trends in the graben or rift-zone like structure of the basement. This structural pattern is supported by the marine seismic and magnetic work carried out in Lazarev Sea during the first Indian expedition and by the geological studies hypothesizing the existence of extensive grabens. (Auth.)

51-1961
Results of electromagnetic and electrical measurements in Antarctica.
Bhattacharya, B.B., Keramat, M., Raju, R.S., Scientific report of Fourth Indian Scientific Expedition to Antarctica, Technical publication No.4, New Delhi, India, Department of Ocean Development, 1987, p.69-81, 10 refs.
DLC G850.I53I53 1984
Geophysical surveys, Ice shelves, Ice cover thickness, Electromagnetic properties, Geoelectricity, Moraines, Antarctica—Dakshin Gangotri Station, Antarctica—Schirmacher Ponds
Transient electromagnetic (TEM) soundings were carried out in Queen Maud Land region of Antarctica. Self-potential (SP) and vertical electrical sounding (VES) measurements were also made in the Schirmacher Ponds. The thickness of the ice shelf in Queen Maud Land is about 200 m. The thickness of the ice cap over the rocky terrain south of the Schirmacher Ponds increases rapidly and at the place of TEM sounding it is of the order of 400 m. Self-potential profiles do not show any characteristic anomaly. VES data reveal that the depth to fresh rock in the Ponds is less than 10 m. TEM method is recommended for determining the thickness of ice cover in Antarctica. (Auth. mod.)

51-1962
Seismic investigations on the ice-shelf near Dakshin Gangotri, Antarctica.
Verma, S.K., Mital, G.S., Dixit, M.M., Reddy, K.N.S., Venkatarayudu, M., Pantulu, K.P., Scientific report of Fourth Indian Scientific Expedition to Antarctica, Technical publication No.4, New Delhi, India, Department of Ocean Development, 1987, p.83-91, 8 refs.
DLC G850.I53I53 1984
Ice shelves, Magnetic surveys, Seismic surveys, Glacier thickness, Geomorphology, Mathematical models, Antarctica—Dakshin Gangotri Station
The results of the seismic investigations around the Dakshin Gangotri Station have established the efficacy of the seismic reflection methods in delineating sub-shelf structures. The results of the seismic interpretation, in conjunction with those obtained from magnetic studies, have led to the proposition of a structural model describing the thicknesses of ice shelf and underlying water and glacial sediment layers above the basement. This model explains a number of geomorphological features in the region. The experience gained in these first-ever seismic studies under the Indian Scientific Research Program in Antarctica also provides valuable information on the type of explosives and the recording media that are suitable in antarctic environs. (Auth.)

51-1963
Radioactivity measurements on some rock and water samples from Dakshin Gangotri, Antarctica.
Verma, S.K., Mital, G.S., Rao, G.V., Rangarajan, R., Reddy, K.N.S., Venkatarayudu, M., Scientific report of Fourth Indian Scientific Expedition to Antarctica, Technical publication No.4, New Delhi, India, Department of Ocean Development, 1987, p.93-98, 1 ref.
DLC G850.I53I53 1984
Radioactivity, Limnology, Rocks, Ice shelves, Water pollution, Tests, Antarctica—Dakshin Gangotri Station
Field measurements and laboratory analyses were carried out on some rock and water samples from the Dakshin Gangotri Station region. It was found that no significant deposits of radioactive minerals exist in the vicinity of Priyadarshini Lake. The water samples collected from the water channels in the ice shelf and from Priyadarshini Lake were found to be free of any hazardous radioactive contaminations. (Auth.)

51-1964
Some geological and glaciological observations during reconnaissance of the terrain south of Dakshin Gangotri Station, Antarctica.
Sangewar, C.V., Scientific report of Fourth Indian Scientific Expedition to Antarctica, Technical publication No.4, New Delhi, India, Department of Ocean Development, 1987, p.99-104.
DLC G850.I53I53 1984
Ice conditions, Ice cover thickness, Terrain identification, Snow vehicles, Moraines, Geomorphology, Cold weather performance, Antarctica—Wohlthat Mountains, Antarctica—Schirmacher Ponds
During the course of reconnaissance of the terrain conditions south of Dakshin Gangotri Station, and possible vehicular route across Wohlthat Mountains further south, some observations of geological and glaciological interest were made enroute in addition to the performance appraisal of the snowmobiles. The efficiency of the vehicles under various terrain and ice conditions was studied. Exercises in establishing communication links between different locations during reconnaissance were also carried out. The surface features and secular changes in different types of the antarctic ice were recorded and glacio-geomorphological studies were carried out in the Schirmacher Ponds. Geological studies revealed the existence of olivine basalt, hornfels, pyroxenite and skarn rocks in the Skaly IGA nunatak area. (Auth.)

51-1965
Development of fire resistant paint for Antarctica.
Dabholkar, D.A., Aggarwal, U.K., Sood, R.C., Scientific report of Fourth Indian Scientific Expedition to Antarctica, Technical publication No.4, New Delhi, India, Department of Ocean Development, 1987, p.187-196, 15 refs.
DLC G850.I53I53 1984
Fires, Wooden structures, Protective coatings, Cold weather construction
Antarctica, with large desolate areas of snow and ice cover, few landmarks and hostile weather, represents extreme conditions of low temperature and high wind velocity. A fireproof paint, which has fire-retardant properties and can simultaneously withstand the antarctic conditions, was developed, evaluated and successfully applied to the wooden structures used at the Indian antarctic stations. (Auth.)

51-1966
Preliminary testing report of some commercial polymers and their utilisation in the antarctic climatic conditions.
Dabholkar, D.A., Saroop, U.K., Sood, R.C., Aggarwal, A.K., Scientific report of Fourth Indian Scientific Expedition to Antarctica, Technical publication No.4, New Delhi, India, Department of Ocean Development, 1987, p.197-203, 7 refs.
DLC G850.I53I53 1984
Polymers, Electrical properties, Thermal properties, Mechanical properties, Cold weather tests
The effects of extreme low temperature and high wind velocity conditions existing in Antarctica have been investigated on various polymeric materials. The selection of polymeric materials ranged from simple polyolefinic polymers, like Low Density Polyethylene (LDPE) and Polypropylene (PP), to engineering and speciality polymers like Acrylonitrile Butadiene Styrene Coplymer (ABS), Polycarbonate and Poly-tetrafluoroethylene (PTFE). The polymeric samples were exposed to the antarctic climate for one month. The samples were then evaluated for thermal, mechanical and electrical properties. No significant changes were observed. Conclusions

about the effect of antarctic climate on the polymers can, however, be drawn only after detailed evaluation of samples exposed for one year. (Auth. mod.)

51-1967

Technical notes on renewable energy systems to be used at the Indian station.

Puri, A., Scientific report of Fourth Indian Scientific Expedition to Antarctica, Technical publication No.4, New Delhi, India, Department of Ocean Development, 1987, p.205-208.

DLC G850.I53I53 1984

Wind power generation, Solar radiation, Heat sources, Test equipment, Low temperature research, Antarctica—Dakshin Gangotri Station, Antarctica—Maitri Station

Renewable energy systems utilizing the wind and solar energy have shown promising results in Antarctica. This paper describes the various renewable energy systems that are proposed to supplement the existing conventional sources of energy. (Auth.)

51-1968

Condensation coefficient of ice under laser sublimation near the melting point. [O vozmozhnosti eksperimental'nogo opredeleniia koeffitsienta kondensatsii l'da pri lazernoĭ sublimatsii vblizi tochki plavleniia]

Butkovskiĭ, A.V., *Teplofizika vysokikh temperatur,* Oct. 1994, 32(5), p.793-797, In Russian. 11 refs.

DLC QC276.T4

Ice sublimation, Lasers, Condensation, Ice composition, Ice crystals, Cloud physics, Ozone, Antarctica

Knowledge of the accurate condensation coefficients of water and ice is essential for modeling cloud formation processes. In addition, recent studies indicate that heterogeneous chemical reactions taking place on ice crystals play an important role in the formation of the ozone hole over the Antarctic. Here, a method is proposed which makes it possible to measure the condensation coefficient of ice near 0°C with an error of not more than 30% using relatively simple equipment.

51-1969

Hearing before the Subcommittee on Science, Technology and Space of the Committee on Commerce, Science and Transportation, U.S. Senate, One Hundred First Congress, First Session, on arctic and antarctic ozone depletion, February 23, 1989.

U.S. Congress. Senate. Committee on Commerce, Science and Transportation, Washington, D.C., U.S. Government Printing Office, 1989, 160p.

DLC KF26.C697 1989

Ozone, Atmospheric composition, Air pollution, Legislation, Environmental protection

The hearing convened on Feb. 23, 1989, to discuss current understanding of the physical and chemical processes that control atmospheric ozone, globally and in the polar regions. Witnesses included representatives of the Air Conditioning and Refrigeration Institute, E.I. DuPont, Inc., NOAA, NASA, and Allied-Signal, Inc., who presented prepared statements and responded to questions from members of the Subcommittee. Additional articles, letters and statements presented at the hearing are also provided.

51-1970

Viewing a cold air outbreak using satellite-based synthetic aperture radar and advanced very high resolution radiometer imagery.

Mourad, P.D., Walter, B.A., *Journal of geophysical research,* July 15, 1996, 101(C7), p.16,391-16,400, 25 refs.

Radiometry, Synthetic aperture radar, Pack ice, Clouds (meteorology), Backscattering, Air masses, Bering Sea

51-1971

Seasonal evolution of sea ice cover and shelf water off Labrador simulated in a coupled ice-ocean model.

Ikeda, M., Yao, T., Yao, Q., *Journal of geophysical research,* July 15, 1996, 101(C7), p.16,465-16,489, 15 refs.

Sea ice, Seasonal variations, Water temperature, Ice cover thickness, Models, Canada—Labrador, North Atlantic Ocean

51-1972

Freezing avoidance and the presence of ice in shallow water antarctic fishes.

Tien, R., University of Illinois, 1995, 147p., University Microfilms order No. DA95-43746, Ph.D. thesis. 67 refs.

Sea ice, Ice formation, Ice crystals, Seasonal variations, Water temperature, Antarctica—McMurdo Sound

Fishes inhabiting ice-laden waters of McMurdo Sound have ice present on all external tissues. This includes the integument, gills, and intestinal tract. With one exception, all internal tissues and fluids including the heart, liver, red muscle, white muscle, blood, bile, urine and ocular fluids are ice-free. Ice is consistently identified in the spleens from three shallow water species. This in vivo presence of ice is presupposed by the in vitro mechanism of antifreeze activity. The presence of internal ice explains why all nototheniids in McMurdo Sound produce high systematic concentrations of antifreezes. Furthermore, its localization to the spleen suggests that one function of this organ is to remove ice crystals from the systematic circulation. Details are provided correlating the presence of ice in these fish with ice formation depths, ice growth, and origin of the very cold water in the Sound. (Auth. mod.)

51-1973

Strategy and a tool, Ferret, for closely integrated visualization and analysis.

Hankin, S., Harrison, D.E., Osborne, J., Davison, J., O'Brien, K., *Journal of visualization and computer animation,* July-Sep. 1996, 7(3), p.149-157, 9 refs.

Data processing, Computer applications, Computer programs, Antarctica—Antarctic Peninsula, —South Georgia, —Falkland Islands, —Tierra del Fuego

Ferret is a workstation-based visualization and analysis environment designed to meet the needs of physical scientists studying global ocean/climate interactions. Ferret provides a highly-automated, flexible, end-to-end environment in which can be probed large and complex gridded data sets, such as model outputs and observational data products, with little or no assistance from computer professionals. The design of Ferret has emphasized close integration of graphics, analysis, and data management. Ferret provides well-proven scientific graphics styles, such as contours, scatter plots, and vector diagrams, and the ability to define new variables as mathematical expressions involving database variables. Analysis is augmented by regridding capabilities and Boolean operators to perform calculations over arbitrary regions. Ferret's data management is based on a simple, adaptable data model integrated with standardized, self-describing, direct-access files. Pictorial examples of antarctic applications include southern elephant seal tracking displays in the waters around the Antarctic Peninsula, South Georgia, the Falkland Islands, Tierra del Fuego, and from 80°W to 20°E between 70° and 50°S. (Auth. mod.)

51-1974

Providing global access to marine data via the World Wide Web.

Dodge, C., Majewski, F., Marx, B., Pfeiffenberger, H., Reinke, M., *Journal of visualization and computer animation,* July-Sep. 1996, 7(3), p.159-168, 7 refs.

Data processing, Geography, Hydrography, Ocean currents, —South Atlantic Ocean, —South Pacific Ocean, —South Indian Ocean

This paper presents development work undertaken at the Alfred Wegener Institute for Polar and Marine Research to enable the distribution of scientific information over the WWW. One of the first projects was to provide an electronic version of the printed 'Hydrographic Atlas of the Southern Ocean'. The 'Southern Ocean' database is presented, the data from which was used for generation of the atlas graphics. This is followed by a discussion of some of the issues related to the creation on the electronic form of the atlas. One major database directly accessible on-line is the 'Ocean-Circulation Database', which comprises measured data from research vessel expeditions from 1985 on. The database itself is introduced, after which a description of the two methods of database query via a Web browser is given. If known, the name of a cruise can be input, or alternatively, one can click in the geographical area of interest on a 'clickable image' map of the world. Each click zooms the user in to the area of interest until the separate measurement points can be resolved. The user can then directly interrogate the database by clicking on the points. (Auth.)

51-1975

High fidelity digital terrain modelling for the reconstruction of the antarctic sea floor.

Falcidieno, B., Orgolesu, S., Pizzi, C., Sanguineti, A., Spagnuolo, M., *Journal of visualization and computer animation,* July-Sep. 1996, 7(3), p.177-187, 13 refs.

Data processing, Bottom topography, Hydrography, Sounding, Oceanography, Models, Antarctica—Terra Nova Bay

Shape-based modelling is a general approach to surface representation, which has a great importance in the specific context of the antarctic sea floor reconstruction, where measurements can involve critical operations. Here, a method is proposed where shape-based surface reconstruction is achieved performing a geometric reasoning on the raw data to delineate a shape structure on which the final surface model can be built. Data of the antarctic sea floor are collected by surveys carried out along parallel courses during which the depth of the sea is measured at almost regular intervals. The seabed is then represented by a set of profiles, corresponding to almost vertical cross sections. The surface reconstruction is performed in three steps. First, a shape-based simplification is carried out on the profiles, using a combination of the wavelet theory and the classical Douglas and Peucker algorithm. The second step consists of finding similarities in the morphology of adjacent profiles, which may suggest the presence of surface features, such as ridges and ravines. Finally, the deduced surface features are used to build a kind of skeleton on which the most appropriate triangulation can be constructed. (Auth.)

51-1976

Spectroscopic measurements of the atmospheric gases contents. Latitudinal distributions, seasonal variations and long-period trends.

Galtsev, A.P., Grechko, E.I., Dzhola, A.V., Elanskiĭ, N.F., Malkov, I.P., Pugachev, N.S., *SPIE—The International Society for Optical Engineering. Proceedings.,* 1993, Vol.2107, Optical monitoring of the environment. Edited by N.N. Belov and E.I. Akopov, p.104-110, 9 refs.

DLC TD193.O68 1993

Gases, Carbon dioxide, Seasonal variations, Atmospheric composition

The results of spectroscopic measurements of the total vertical column abundance of minor atmospheric components (CO, CH_4, C_2H_6, NO_2, O_3) are presented. Measurements were carried out in Russia, in the arctic and antarctic regions and over the Atlantic Ocean. (Auth.)

51-1977

Spectrometric measurements of total NO_2 in different regions of the globe.

Elokhov, A.S., Gruzdev, A.N., *SPIE—The International Society for Optical Engineering. Proceedings,* 1993, Vol.2107, Optical monitoring of the environment. Edited by N.N. Belov and E.I. Akopov, p.111-121, 28 refs.

DLC TD193.O68 1993

Gases, Atmospheric composition, Antarctica—Molodezhnaya Station, Antarctica—Mirnyy Station, Antarctica—Weddell Sea

The paper reviews the results of measurements of the total NO_2 contents in different regions of the globe: in the antarctic region, in the Atlantic Ocean, at the Zvenigorod Scientific Station of the Institute of Atmospheric Physics. Total NO_2 obtained at Molodezhnaya in spring 1987 was very low until late Nov. with stratospheric warming when the filling of the ozone "hole" began. Measurements at Mirnyy in 1988 show the summer maximum and the usual later decrease in total NO_2. Total NO_2 measured in the Weddell Sea during Sep.-Oct. 1989 exhibits large variations connected with the evolution of the stratospheric circumpolar vortex. Measurements over the Atlantic Ocean in May 1988 show the increase with latitude in total NO_2 and total ozone, most pronounced in the region of the northern subtropical jet stream. A thin latitudinal structure in total ozone and NO_2 has been found connected with stratosphere-troposphere exchange processes, and is confirmed by measurements during Aug.-Sep. and Nov.-Dec. 1989. In addition, the inter-hemispheric difference in total NO_2 is noted in 1989 measurements, associated with the NO_2 annual cycle. Also a sharp decrease in total NO_2 is noted at mid- and high latitudes of the Southern Hemisphere in spring 1989. Near Moscow, systematic total NO_2 measurements have been made since 1990. A decrease of up to 40% in total NO_2 occurred during the spring-summer period of 1992 compared with the same period of 1991, perhaps due to the eruption of the Pinatubo volcano in June 1991. (Auth. mod.)

51-1978

Recrystallization in a freezing tolerant antarctic nematode, *Panagroliamus davidi*, and an alpine weta, *Hemideina maori* (Orthoptera; Stenopelmatidae).

Ramløv, J., Wharton, D.A., Wilson, P.W., *Cryobiology,* Dec. 1996, 33(6), p.607-613, 16 refs.

Cryobiology, Ecology, Ice crystal growth, Recrystallization, Freezing points, Chemical properties, Ice prevention, Frost resistance, Cold weather survival

The ability of haemolymph from the freezing tolerant weta, *Hemideina maori,* and supernatant from homogenates of the freezing tolerant antarctic nematode *Panagrolaimus davidi* to inhibit the recrystallization of ice was examined using the "splat freezing" technique and annealing on a cryomicroscope stage. There was no recrystallization inhibition in weta haemolymph or in insect ringer controls. Recrystallization inhibition was present in the nematode supernatant but this was destroyed by heating and was absent in controls. *P. davidi* survives intracellular freezing and recrystallization inhibition may be important for the survival of this stress. (Auth. mod.)

51-1979

Simulation model for the annual frost hardiness and freeze damage of Scots pine.

Leinonen, I., *Annals of botany,* Dec. 1996, 78(6), p.687-693, 42 refs.

Trees (plants), Plant physiology, Acclimatization, Climatic changes, Frost resistance, Plant tissues, Damage, Growth, Seasonal variations, Simulation, Mathematical models, Temperature effects

51-1980

Seasonal variation in respiratory and photosynthetic parameters in three mosses from the maritime Antarctic.

Davey, M.C., Rothery, P., *Annals of botany,* Dec. 1996, 78(6), p.719-728, 42 refs.

Plant ecology, Plant physiology, Mosses, Photosynthesis, Vapor diffusion, Biomass, Temperature effects, Insolation, Seasonal variations, Sampling

Carbon fixation under controlled conditions was measured in three mosses from the maritime Antarctic using an infra-red gas analysis system. Gas exchange parameters were determined during each season in 1993 and 1994 using the Arrhenius equation and a hyperbolic tangent function applied to respiration and photosynthesis, respectively. There was some seasonal variation in the initial slope of the photosynthesis-irradiance curve in all species, although the environmental data suggested that this was of little ecological importance. In all species seasonal changes in the maximum rates of photosynthesis were observed. These changes are considered to be the most important in affecting the overall annual productivity of the mosses. There were no seasonal variations in the optimum temperatures for either gross or net photosynthesis, or for the irradiance at the onset of light saturation. The results have important implications for the use of models to estimate the productivity of the antarctic flora based upon present or predicted climate data. (Auth. mod.)

51-1981

Anthropogenic and natural disturbances to marine benthic communities in Antarctica.

Lenihan, H.S., Oliver, J.S., *Ecological applications,* May 1995, 5(2), p.311-326, 72 refs.

Marine biology, Ocean bottom, Ecosystems, Bottom sediment, Hydrocarbons, Waste disposal, Water pollution, Environmental impact, Sampling, Biomass

This study describes changes in marine bottom communities along a well-defined gradient of contamination in Antarctica. Community changes were characterized and results used to explore the recovery of disturbed communities. The authors tested the hypotheses that relative rates of recovery of disturbed communities are: (1) dependent on the initial structure of the community and (2) much slower in eutrophic habitats compared with oligotrophic habitats. Based on the results of these tests, predictions of the impacts of future anthropogenic disturbances in different oceanographic conditions of McMurdo Sound were derived. Also tested was the hypothesis that community responses to anthropogenic chemical contamination are similar to those around natural physical disturbances (those caused by icebergs and anchor ice). (Auth. mod.)

51-1982

Performance evaluation of overland flow wastewater treatment system under winter and summer conditions.

Surampalli, R.Y., Chou, S.C., Banerji, S.K., *Journal of cold regions engineering,* Dec. 1996, 10(4), p.163-177, 16 refs.

Waste treatment, Water treatment, Municipal engineering, Ground water, Seepage, Suspended sediments, Water transport, Seasonal variations, Hydraulics, Temperature effects, Hydrogeochemistry, Correlation

51-1983

Predicting breakup ice jams using logistic regression.

White, K.D., MP 3928, *Journal of cold regions engineering,* Dec. 1996, 10(4), p.178-189, 18 refs.

River ice, Ice jams, Ice breakup, Forecasting, Classifications, Statistical analysis, Models, Accuracy

Breakup ice jams form suddenly and with little warning. The lack of forewarning hinders emergency response and ice jam mitigation efforts. Present knowledge of breakup jam processes does not allow for the development of a deterministic ice jam prediction model. Probabilistically based prediction models include linear regression, discriminant function analysis, and empirical cluster-type analyses. In this paper, the use of logistic regression to predict breakup ice jam occurrence is presented, with an example application for the Platte River at North Bend, NE.

51-1984

Ice jam mitigation using setback dykes: Coldwater River at Merritt, B.C.

Beltaos, S., Doyle, P.F., *Journal of cold regions engineering,* Dec. 1996, 10(4), p.190-206, 19 refs.

River ice, Ice jams, Floodplains, Countermeasures, Water level, Flood forecasting, Banks (waterways), Levees, Bank protection (waterways), Mathematical models, Canada—Ontario—Coldwater River

51-1985

Sea ice and iceberg observations in the western Barents Sea in 1987.

Løset, S., Carstens, T., *Cold regions science and technology,* Dec. 1996, 24(4), p.323-340, 27 refs.

Oceanographic surveys, Sea ice distribution, Icebergs, Ice volume, Drift, Ice edge, Velocity measurement, Statistical analysis, Barents Sea

51-1986

Optical measurements of frazil concentration.

Pegau, W.S., Paulson, C.A., Zaneveld, J.R.V., *Cold regions science and technology,* Dec. 1996, 24(4), p.341-353, 30 refs.

Sea ice, Frazil ice, Ice growth, Ice water interface, Ice optics, Light transmission, Radiation absorption, Attenuation, Polarization (waves), Static stability, Radiation measuring instruments

51-1987

Airborne electromagnetic system on a fixed wing aircraft for sea ice thickness mapping.

Multala, J., et al, *Cold regions science and technology,* Dec. 1996, 24(4), p.355-373, 36 refs.

Sea ice, Ice cover thickness, Pressure ridges, Aerial surveys, Sensor mapping, Lasers, Ice dielectrics, Electrical resistivity, Magnetic anomalies, Profiles, Topographic features

51-1988

Change in arctic CO_2 flux over two decades: effects of climate change at Barrow, Alaska.

Oechel, W.C., Vourlitis, G.L., Hastings, S.J., Bochkarev, S.A., *Ecological applications,* Aug. 1995, 5(3), p.846-855, 44 refs.

Subpolar regions, Climatology, Climatic changes, Tundra climate, Tundra vegetation, Ecosystems, Carbon dioxide, Soil air interface, Vapor diffusion, Atmospheric composition, Seasonal variations, Sampling, Permafrost hydrology, United States—Alaska—Barrow

51-1989

Simple monthly runoff model for snow dominated catchments in Western Himalayas.

Rao, S.V.N., Ramasastri, K.S., Singh, R.N.P., *Nordic hydrology,* 1996, 27(4), p.255-274, 21 refs.

River basins, Snow hydrology, Runoff forecasting, Snowmelt, Snow line, Altitude, Snow cover distribution, Degree days, Meteorological factors, Mathematical models, Correlation, India—Himalaya Mountains

51-1990

Remote sensing analysis of vegetation damage around metal smelters in the Kola Peninsula, Russia.

Mikkola, K., *International journal of remote sensing,* Dec. 1996, 17(18), p.3675-3690, 34 refs.

Remote sensing, Spaceborne photography, LANDSAT, Terrain identification, Image processing, Air pollution, Aerosols, Subarctic landscapes, Forest ecosystems, Damage, Vegetation patterns, Environmental impact, Russia—Kola Peninsula

51-1991

Measured and modelled local wind fields over a frozen lake in a mountainous area.

Smedman, A.S., Bergström, H., Högström, U., *Contributions to atmospheric physics,* Nov. 1996, 69(4), p.501-516, 12 refs.

Wind (meteorology), Icebound lakes, Turbulent boundary layer, Lake ice, Turbulent flow, Ice air interface, Wind direction, Wind velocity, Sounding, Ice cover effect, Simulation, Mathematical models, Fluid dynamics

51-1992

Mesoproterozoic deep-water reefs from Borden Peninsula, arctic Canada.

Narbonne, G.M., James, N.P., *Sedimentology,* Oct. 1996, 43(5), p.827-848, Refs. p.846-848.

Arctic landscapes, Pleistocene, Paleoecology, Sea level, Marine geology, Sedimentation, Marine deposits, Stratigraphy, Geomorphology, Stratification, Canada—Northwest Territories—Baffin Island

51-1993

Dynamics of sediment-laden underflows passing over a subaqueous sill: glacier-fed Peyto Lake, Alberta, Canada.

Chikita, K.A., Smith, N.D., Yonemitsu, N., Perez-Arlucea, M., *Sedimentology,* Oct. 1996, 43(5), p.865-875, 13 refs.

Glacial hydrology, Meltwater, Glacial lakes, Lacustrine deposits, Lake water, Hydrography, Profiles, Sediment transport, Suspended sediments, Turbidity, Buoyancy, Turbulent exchange, Wind factors, Canada—Alberta—Peyto Lake

51-1994

Feature selection for classification of polar regions using a fuzzy expert system.

Penaloza, M.A., Welch, R.M., *Remote sensing of environment,* Oct. 1996, 58(1), p.81-100, 38 refs.

Remote sensing, Polar atmospheres, Cloud cover, Radiometry, Albedo, Spaceborne photography, Image processing, Classifications, Statistical analysis, Accuracy, Snow cover effect, Ice cover effect

51-1995

Experimental investigation of a new and energy-saving nacelle anti-ice system.

Massardo, A.F., Farinazzo, E., *Journal of aircraft,* Nov.-Dec. 1996, 33(6), p.1033-1039, 7 refs.

Aircraft icing, Jet engines, Fluid dynamics, Ice prevention, Ice control, Countermeasures, Air flow, Mass flow, Surface temperature, Temperature control, Radiant heating, Heat transfer coefficient, Simulation

51-1996

Airfoil performance degradation by supercooled cloud, drizzle, and rain drop icing.

Ashenden, R., Lindberg, W., Marwitz, J.D., Hoxie, B., *Journal of aircraft,* Nov.-Dec. 1996, 33(6), p.1040-1046, 13 refs.

Aircraft icing, Performance, Degradation, Precipitation (meteorology), Ice air interface, Fluid dynamics, Ice accretion, Profiles, Supercooled clouds, Wind tunnels, Computerized simulation, Surface roughness, Topographic effects

51-1997

Moisture transfer and heaving pressure in freezing rocks containing water-soluble compounds.

Brovka, G.P., Dediulia, I.V., *Colloid journal,* Sep.-Oct. 1996, 58(5), p.553-556, Translated from Kolloidnyĭ zhurnal. 5 refs.

Geocryology, Peat, Frozen ground expansion, Frost heave, Soil water migration, Ice water interface, Thermodynamic properties, Water pressure, Porosity, Simulation

51-1998

Desorption and crystallization kinetics in nanoscale thin films of amorphous water ice.

Smith, R.S., Huang, C., Wong, E.K.L., Kay, B.D., *Surface science,* Nov. 10, 1996, 367(1), p.L13-L18, 38 refs.

Ice physics, Water films, Amorphous ice, Ice solid interface, Substrates, Ice sublimation, Deuterium oxide ice, Ice spectroscopy, Spectra, Phase transformations, Microstructure

51-1999

Substrate dependent sublimation kinetics of mesoscopic ice films.

Löftren, P., Ahlström, P., Chakarov, D.V., Lausmaa, J., Kasemo, B., *Surface science,* Nov. 10, 1996, 367(1), p.L19-L25, 22 refs.

Ice physics, Ice solid interface, Thickness, Substrates, Phase transformations, Ice sublimation, Wettability, Vacuum freezing, Ice spectroscopy, Computerized simulation

51-2000

Index of injury compared to tissue ionic conductance for calculating freeze damage of cabbage tissues.

Manley, R.C., Hummel, R.L., *American Society for Horticultural Science. Journal,* Nov. 1996, 121(6), p.1141-1146, 22 refs.

Plant physiology, Plant tissues, Frost resistance, Damage, Indexes (ratios), Freezing points, Electrical resistivity, Ion diffusion, Viability, Cold weather tests, Simulation, Statistical analysis

51-2001

Test of indices for classification of winter climate.

Gustavsson, T., *Meteorological applications,* Sep. 1996, 3(3), p.215-222, 12 refs.

Climatology, Road icing, Ice forecasting, Salting, Surface temperature, Weather forecasting, Indexes (ratios), Classifications, Meteorological data, Statistical analysis

51-2002

Forecasting road-surface temperatures for different site characteristics.

Jacobs, W., Raatz, W.E., *Meteorological applications,* Sep. 1996, 3(3), p.243-256, 33 refs.

Road icing, Surface temperature, Temperature variations, Air temperature, Heat balance, Snowmelt, Snow cover effect, Forecasting, Statistical analysis, Mathematical models, Insolation

51-2003

Improving forecasting performance by combining forecasts: the example of road-surface temperature forecasts.

Brown, B.G., Murphy, A.H., *Meteorological applications,* Sep. 1996, 3(3), p.257-265, 14 refs.

Weather forecasting, Surface temperature, Road icing, Ice forecasting, Frost forecasting, Temperature variations, Accuracy, Statistical analysis

51-2004

Kinetic model for crystallization in porous media.

Bronfenbrener, L., Korin, E., *International journal of heat and mass transfer,* Mar. 1997, 40(5), p.1053-1059, 17 refs.

Soil freezing, Frozen ground thermodynamics, Heat transfer, Mass transfer, Unfrozen water content, Freezing front, Phase transformations, Soil water migration, Ice water interface, Stability, Mathematical models

51-2005

Investigation of the spatial association between snow depth and topography in a prairie agricultural landscape using digital terrain analysis.

Lapen, D.R., Martz, L.W., *Journal of hydrology,* Oct. 15, 1996, 184(3-4), p.277-298, 34 refs.

Snow depth, Snow surveys, Snow cover distribution, Snow cover effect, Plains, Topographic effects, Landscape types, Topographic surveys, Classifications, Statistical analysis, Correlation

51-2006

Friction performance of sports luges and bobsleds sliding along ice tracks.

Balakin, V.A., *Journal of friction and wear,* 1996, 17(1), p.29-36, Translated from Trenie i iznos. 9 refs.

Sleds, Sliding, Ice solid interface, Metal ice friction, Velocity measurement, Design, Joints (junctions), Deformation, Mathematical models, Topographic effects, Performance

51-2007

Normalized fluctuations, H_2O vs *n*-hexane: site-correlated percolation.

Koga, Y., Westh, P., Sawamura, S., Taniguchi, Y., *Journal of chemical physics,* Aug. 1, 1996, 105(5), p.2028-2033, 50 refs.

Water structure, Ice physics, Frozen liquids, Hydrogen bonds, Molecular energy levels, Hydrocarbons, Freezing points, Temperature effects, Thermodynamics, Statistical analysis

51-2008

Supercooled water and the kinetic glass transition.

Sciortino, F., Gallo, P., Tartaglia, P., Chen, S.H., *Physical review E,* Dec. 1996, 54(6), p.6331-6343, 51 refs.

Supercooling, Water structure, Ice physics, Liquid cooling, Phase transformations, Ice formation, Temperature effects, Thermodynamic properties, Statistical analysis, Simulation, Theories, Molecular energy levels

51-2009

Annual report of the United States Arctic Research Commission to the President and the Congress of the United States, fiscal years 1994 and 1995, including a special section on arctic research goals and priorities.

U.S. Arctic Research Commission, Arlington, VA, Jan. 1996, 128p., List of publications on inside back cover, 24 items.

Research projects, Organizations, Regional planning, International cooperation, Meetings, Legislation, Cost analysis

51-2010

Guidebook to the Quaternary geology of central and south-central Alaska.

Péwé, T.L., ed, College, AK, Alaska Department of Natural Resources, Division of Geological and Geophysical Surveys, 1977, 141p., Refs. passim. Prepared for Field Conference F of the 7th INQUA (International Association for Quaternary Research) Congress, Aug. 18-29, 1965. Originally published by the Nebraska Academy of Sciences, Lincoln, NE, 1965.

Geological surveys, Glaciation, Glacial geology, Glacial deposits, Quaternary deposits, Outwash, Alluvium, Eolian soils, Periglacial processes, Permafrost surveys, Permafrost indicators, Permafrost origin, Thermokarst, Stratigraphy, United States—Alaska

51-2011

Work of the Working Group on Arctic International Relations.

Young, O.R., *Dartmouth College, Hanover, NH. Northern notes,* Dec. 1996, No.4, p.1-19, Refs. passim.

International cooperation, Regional planning, Environmental protection

51-2012

Dartmouth in the North. *Dartmouth College, Hanover, NH. Northern notes,* Dec. 1996, No.4, p.79-91, 28 refs.

Organizations, Education, Meetings, Research projects, International cooperation, Regional planning

51-2013

EOS: science strategy for the Earth Observing System.

Asrar, G., Dozier, J., Woodbury, NY, American Institute of Physics, AIP Press, 1994, 119p., Refs. passim.

DLC QC861.2.A85 1994

Atmospheric composition, Atmospheric circulation, Cloud cover, Hydrologic cycle, Global warming, Spaceborne photography, Research projects

51-2014

Breaking ice jams.

U.S. Army Corps of Engineers, Jan. 1985, 27p.

River ice, Ice jams, Ice breaking, Ice control, Flood control

51-2015

Prevention of snowdrifting at the Dye sites.

Keitz, E.L., *New York University. College of Engineering. Research Division. Report,* Oct. 1960, No.799-01, 16p. + figs., 4 refs.

Snowdrifts, Blowing snow, Snow retention, Snow fences, Snowsheds, Wind tunnels, Environmental tests, Greenland

51-2016

Motion characteristics of coarse sediment in a gravel bed river.

Chacho, E.F., Jr., Burrows, R.L., Emmett, W.W., MP 3929, Federal Interagency Sedimentation Conference, 6th, Las Vegas, NV, Mar. 10-14, 1996. Proceedings, Reston, VA, U.S. Geological Survey. Interagency Advisory Committee on Water Data. Subcommittee on Sedimentation, 1996, p.V/1-V/8, 4 refs.

River flow, Bottom sediment, Suspended sediments, Alluvium, Sediment transport, Flood forecasting, Telemetering equipment, Data transmission

Radio transmitters were implanted in natural river gravel to locate and track the movement of coarse sediment (39 mm or larger) through a natural river reach. An automatic data acquisition system was developed to continuously monitor the radio-implanted sediment particles to determine the travel time of the rocks through a 362-m study reach. A total of 24 radio-tagged rocks was monitored either continuously or by periodic location surveys. The travel time of the rocks through the study reach is better related to specific gravity than weight of the particles. In addition the automatic data acquisition system continuously monitors the periods of motion and rest of natural river gravel implanted with radio transmitters equipped with motion sensors. The capabilities of the system are demonstrated by describing the motion and rest periods of a single rock for a two-month period including a number of flood events.

51-2017

Quantitative heat loss determination by means of infrared thermography—the TX model.

Zinko, H., et al, MP 3930, International Energy Agency. IEA District Heating and Cooling Project. Annex 4, Sittard, Netherlands, Netherlands Agency for Energy and the Environment (NOVEM), 1996, 114p., 22 refs.

Heat pipes, Underground pipelines, Utilities, Heat loss, Heat transfer, Soil temperature, Temperature measurement, Subsurface investigations, Infrared photography, Computer programs

51-2018

Beaufort Region Environmental Assessment and Monitoring Program (BREAM): final report for 1992/1993.

Vonk, P., ed, Duval, W., ed, Thomas, D., ed, *Canada. Department of Indian Affairs and Northern Development. Environmental studies,* Aug. 1993, No.71, 298p., Canadian Theses Service, MIC94-04083, With French summary. Refs. passim.

Offshore drilling, Pipelines, Oil spills, Oil recovery, Water pollution, Soil pollution, Environmental impact, Regional planning, Canada, Beaufort Sea

51-2019

GOME data processing at DFD. [GOME-Datenferarbeitung beim DFD]

Balzer, W., Loyola, D., Spurr, R., Zahn, C., *DLR-Nachtrichten,* May 1996, No.82, p.48-54, In German.

DLC TL526.63D39a

Ozone, Data processing, Solar radiation, Models, Antarctica—Amundsen-Scott Station

GOME is a scanning spectrometer used to measure the backscattered radiation of the Earth as well as the solar radiant flux density with a high spectral resolution for a satellite-borne system. The use of GOME, the instrument, to study the stratospheric ozone layer is addressed, with emphasis on the data processing. Data measurements of stratospheric ozone from antarctic regions are included and discussed. (Auth. mod.)

51-2020

Correlations between ozone loss and volcanic aerosol at altitudes below 14 km over McMurdo Station.

Deshler, T., Johnson, B.J., Hofmann, D.J., Nardi, B., *Geophysical research letters,* Oct. 15, 1996, 23(21), p.2931-2934, 16 refs.

Ozone, Aerosols, Volcanic ash, Stratosphere, Antarctica—McMurdo Station

Ozone and aerosol profiles over McMurdo Station have been measured Aug.-Oct. for the years 1986-1995. This spans the development and decay of the recent perturbation to stratospheric aerosol caused by Pinatubo. Volcanic aerosol surface areas, in the 11-14 km region, peaked near 100 $\mu m^2/cm^3$ in 1991, decaying to 20-30 $\mu m^2/cm^3$ in 1992, 15-25 $\mu m^2/cm^3$ in 1993, and to background levels of 4-8 $\mu m^2/cm^3$ in 1994. Based on these measurements the volcanic aerosol signal persisted over Antarctica for three austral springs, implying an exponential decay rate of about 14 months. The aerosol below 14 km was correlated with previously unobserved ozone loss at these altitudes. Ozone loss rates of 5-15 ppb/dy (0.3-0.5 DU/dy) were observed in the 10-12 and 12-14 km layers. Beginning in 1994,

when the aerosol approached its pre-Pinatubo level, ozone loss diminished in the 12-14 km layer, and was not observed in the 10-12 km layer. (Auth.)

51-2021

Now you see it, now you don't: the ozone hole.

Wilkniss, P.E., *Forum for applied research and public policy,* Summer 1990, 5(2), p.29-36, 16 refs.

Atmospheric composition, Ozone, Solar radiation, Clouds (meteorology)

Insights are provided to the good and bad qualities of ozone and to the ozone hole over Antarctica. Chemicals and chemical processes which deplete the stratospheric ozone layer are discussed along with man-made influences on the depletion cycle. Research programs dealing with this problem since the IGY and since 1985 are identified. The dimension and scope of the ozone hole, its research and education aspects, and economic and political considerations are briefly stated as policy issues. A possible model for political response is suggested in some of the actions already taken to alleviate the problem.

51-2022

Peracarid fauna (Crustacea, Malacostraca) of the Northeast Water Polynya off Greenland: documenting close benthic-pelagic coupling in the Westwind Trough.

Brandt, A., *Marine ecology progress series,* May 25, 1995, 121(1-3), p.39-51, 83 refs.

Polynyas, Marine biology, Bottom topography, Greenland

51-2023

Geocryological aspects of underground burial of medium- and low-radioactive waste.

Ershov, E.D., Lisitsyna, O.M., Parmuzin, S.IU., *Moscow University geology bulletin,* 1995, 50(6), p.33-45, Translated from Vestnik Moskovskogo Universiteta. Geologiia. 11 refs.

Radioactive wastes, Waste disposal, Geocryology, Storage, Pits (excavations), Insulation, Permafrost thermal properties, Stability, Ground thawing, Frozen ground temperature, Mapping, Environmental protection

51-2024

Heat and moisture exchange over inhomogeneous ice surface.

Nadezhina, E.D., Sternzat, A.V., *Russian meteorology and hydrology,* 1996, No.2, p.37-44, Translated from Meteorologiia i gidrologiia. 14 refs.

Marine meteorology, Marine atmospheres, Atmospheric boundary layer, Sea ice, Ice openings, Ice edge, Air ice water interaction, Ice cover effect, Moisture transfer, Heat flux, Advection, Surface roughness, Wind factors, Analysis (mathematics)

51-2025

Mesoscale convective systems defined by their 85-GHz ice scattering signature: size and intensity comparison over tropical oceans and continents.

Mohr, K.I., Zipser, E.J., *Monthly weather review,* Nov. 1996, 124(11), p.2417-2437, 45 refs.

Climatology, Atmospheric circulation, Convection, Atmospheric boundary layer, Cloud physics, Radiometry, Spaceborne photography, Ice crystal optics, Light scattering, Brightness, Correlation, Statistical analysis

51-2026

Front Range blizzard of 1990. Part II: melting effects in a convective band.

Heffernan, E., Marwitz, J., *Monthly weather review,* Nov. 1996, 124(11), p.2469-2482, 28 refs.

Precipitation (meteorology), Fronts (meteorology), Synoptic meteorology, Cloud physics, Air flow, Snowstorms, Sounding, Radar echoes, Snowflakes, Snow melting, Heat loss, Convection, Turbulent exchange

51-2027

Front Range blizzard of 1990. Part III: numerical simulations of melting effects.

Wei, Y.L., Marwitz, J., *Monthly weather review,* Nov. 1996, 124(11), p.2483-2496, 28 refs.

Synoptic meteorology, Fronts (meteorology), Precipitation (meteorology), Snowstorms, Ice physics, Wind direction, Snowflakes, Snow melting, Heat loss, Snow air interface, Topographic effects, Mathematical models, Thermodynamics

51-2028

Was a short-lived Baffin Bay plume active prior to initiation of the present Icelandic plume? Clues from the high-Mg picrites of West Greenland.

Gill, R.C.O., Holm, P.M., Nielsen, T.F.D., *Lithos,* Jan. 1995, 34(1-3), p.27-39, 33 refs.

Tectonics, Marine geology, Lithology, Sedimentation, Subsidence, Continental drift, Subpolar regions, Volcanoes, Magma, Geothermy, Iceland, Greenland, Labrador Sea

51-2029

Characteristics of road deicers produced from the utilization of water plant residuals and cement wastes.

Mathews, S.P., Choi, C.H., Dwyer, S., *Journal of environmental science and health,* Jan. 1996, A31(1), p.101-122, 15 refs.

Road icing, Chemical ice prevention, Salting, Admixtures, Performance, Chemical properties, Sludges, Cements, Waste disposal, Ice melting, Temperature effects, Simulation

51-2030

Geologists in hot water as icecap springs a leak.

MacKenzie, D., *New scientist,* Nov. 16, 1996, 152(2056), p.5.

Glacial hydrology, Glacier melting, Turbulent flow, Geothermal thawing, Volcanoes, Geologic processes, Iceland—Vatnajökull

51-2031

Did cataclysm 'jump-start' the Gulf Stream?

Stokstad, E., *New scientist,* Nov. 16, 1996, 152(2056), p.19.

Paleoclimatology, Oceanography, Atmospheric circulation, Ocean currents, Glacial lakes, Glacier melting, Meltwater, Lake bursts, Surface drainage, Freezing, Air ice water interaction, Heat flux

51-2032

Wobbling world brings iceberg surges.

Bergeron, L., *New scientist,* Jan. 4, 1997, 153(2063), p.14.

Marine geology, Marine deposits, Glacial deposits, Paleoecology, Paleoclimatology, Icebergs, Calving, Ice age theory, Drill core analysis, Snow cover effect

51-2033

Northumberland's ice breaker.

Gilmour, R., Sauvageot, G., Tassin, D., Lockwood, J.D., *Civil engineering,* Jan. 1997, 67(1), p.34-38.

Bridges, Concrete structures, Precast concretes, Modular construction, Superstructures, Design criteria, Ice floes, Ice loads, Countermeasures

51-2034

Rise and demise of cold-climate *Picea abies* forest in Sweden.

Kullman, L., *New phytologist,* Oct. 1996, 134(2), p.243-256, Refs. p.255-256.

Forest ecosystems, Forest canopy, Paleoecology, Vegetation patterns, Viability, Desiccation, Cold stress, Climatic factors, Soil temperature, Snow cover effect, Temperature effects, Geochronology, Radioactive age determination, Sweden

51-2035

Numerical modeling investigation of a case of polar airstream cyclogenesis over the Gulf of Alaska.

Blier, W., *Monthly weather review,* Dec. 1996, 124(12), p.2703-2725, Refs. p.2723-2725.

Atmospheric circulation, Atmospheric disturbances, Marine atmospheres, Polar atmospheres, Advection, Fronts (meteorology), Heat flux, Air ice water interaction, Ice cover effect, Ice edge, Mathematical models, United States—Alaska—Alaska, Gulf

51-2036

Millimeter wave radar scattering from model ice crystal distributions.

Aydin, K., Tang, C.X., *IEEE transactions on geoscience and remote sensing,* Jan. 1997, 35(1), p.140-146, 27 refs.

Remote sensing, Clouds (meteorology), Cloud physics, Ice detection, Ice crystal optics, Ice crystal structure, Radar echoes, Orientation, Scattering, Polarization (waves), Ice models, Mathematical models

51-2037

Effect of inhomogeneous roughness on radar backscattering from slightly deformed sea ice.

Dierking, W., Carlström, A., Ulander, L.M.H., *IEEE transactions on geoscience and remote sensing,* Jan. 1997, 35(1), p.147-159, 36 refs.

Sea ice, Slush, Remote sensing, Synthetic aperture radar, Radar echoes, Backscattering, Ice optics, Surface roughness, Profiles, Classifications, Topographic effects, Snow cover effect

51-2038

Characterization of water in peat.

McBrierty, V.J., Wardell, G.E., Keely, C.M., O'Neill, E.P., Prasad, M., *Soil Science Society of America. Journal,* July-Aug. 1996, 60(4), p.991-1000, 26 refs.

Soil physics, Soil structure, Hydrology, Peat, Physical properties, Hygroscopic water, Absorption, Moisture transfer, Unfrozen water content, Temperature effects, Temperature measurement, Soil tests

51-2039

Effects of interannual climate variations on phenology and growth of two alpine forbs.

Walker, M.D., Ingersol, R.C., Webber, P.J., *Ecology,* June 1995, 76(4), p.1067-1083, Refs. p.1079-1083.

Phenology, Ecosystems, Alpine landscapes, Plant ecology, Growth, Biomass, Climatic factors, Snowmelt, Snow cover effect, Seasonal variations, Vegetation patterns

51-2040

Development of a high accuracy resistance and temperature meter for field use.

Landmann, W.S., MP 3931, Northvale, NJ, Inrad, Inc., Aug. 1992, 25p., Submitted to the U.S. Army Cold Regions Research and Engineering Laboratory under the SBIR (Small Business Innovative Research) Program Contract No.DACA-39-89-C-0002.

Temperature measurement, Resistance thermometers, Thermistors, Computer applications, Cold weather performance

51-2041

Detailed test plan of the Preproduction Qualification Test (PPQT) for the Intermediate Cold-Wet Boot (ICWB), the Extreme Cold-Weather Boot (ECWB), and the Second Generation Extended Cold-Weather Clothing System (2GECWCS) insulating liners.

Davis, J.B., Dudek, W.A., Carter, F., U.S. Army Test and Evaluation Command TECOM Project No.8-EI-495-ECB-001, Fort Greely, AK, U.S. Army Cold Regions Test Center, Dec. 1996, 41p. + appends., 7 refs.

Clothing, Thermal insulation, Human factors engineering, Military equipment, Cold weather tests

51-2042

Snow booklet: a guide to the science, climatology, and measurement of snow in the United States.

Doesken, N.J., Judson, A., Fort Collins, Colorado State University, Department of Atmospheric Science, Colorado Climate Center, 1996, 84p., 24 refs.

Snowfall, Snowstorms, Snow depth, Snow survey tools, Snow water equivalent, Snow cover stability, Avalanches, Weather forecasting

51-2043

Head up display panel meter featuring live NTSC video with superimposed concurrent measurement data.

Burch, C.A., MP 3932, Ramsey, NJ, Micro Devices Corporation, Jan. 1993, 14p., 4 refs. Submitted to the U.S. Army Cold Regions Research and Engineering Laboratory under the SBIR (Small Business Innovative Research) Program Contract No.DACA33-91-C-0014.

Image processing, Data processing, Data transmission, Telemetering equipment, Photographic equipment, Photographic reconnaissance, Ice conditions, Ice reporting

51-2044

Light transmission through floating ice covers: submersible ice spectroradiometer.

Curtiss, B., Goetz, A.F.H., MP 3933, Boulder, CO, Analytical Spectral Devices, Inc., June 1993, 24p., 14 refs. Submitted to the U.S. Army Cold Regions Research and Engineering Laboratory under the SBIR (Small Business Innovative Research) Program Contract No.DACA33-93-C-0007.

Ice optics, Ice cover effect, Ice water interface, Subglacial observations, Light transmission, Light scattering, Optical absorption, Photometry

51-2045

Fiberoptic sensor to measure pressure in freezing and thawing soils.

Twersky, M., MP 3934, Lincoln, NE, Management Information Resources, Sep. 1992, 29p., 19 refs. Submitted to the U.S. Army Cold Regions Research and Engineering Laboratory under the SBIR (Small Business Innovative Research) Program Contract No.DACA33-91-C-0011.

Soil freezing, Ground thawing, Frost penetration, Thaw depth, Soil pressure, Soil tests, Freeze thaw tests, Frost resistance

51-2046

Development of advanced instrumentation for drop size and liquid water content measurements in clouds.

Aerometrics, Inc., Sunnyvale, CA, MP 3935, Aug. 1992, 74p., Refs. p.64-74. Submitted to the U.S. Army Cold Regions Research and Engineering Laboratory under the SBIR (Small Business Innovative Research) Program Contract No.DACA33-87-C-0027.

Aircraft icing, Ice forecasting, Supercooled clouds, Cloud droplets, Particle size distribution, Unfrozen water content, Moisture detection, Lasers

51-2047

Method for producing performance evaluation soil/sediment samples for white phosphorous analysis.

Walsh, M.E., SR 96-18, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Sep. 1996, 12p., ADA-318 509, 13 refs.

Soil pollution, Soil chemistry, Soil tests, Soil analysis, Explosives, Chemical analysis

The analysis of performance evaluation samples is a routine part of most quality assurance programs. However, performance evaluation samples are not commercially available for many contaminants. This report describes the development of performance evaluation samples for white phosphorus (P_4) analysis. To represent the wide range of concentrations that have been measured in field-contaminated sediment/soil samples, two types of performance evaluation samples were prepared. High concentration samples contained particulate white phosphorus in wet soil, and concentrations were stable for over 100 days. Low concentration soil samples containing white phosphorus dissolved in water or organic solvent were unstable. When silt-size glass beads were substituted for the soil, and a solution of white phosphorus in mineral oil added, concentrations were stable for over two months.

51-2048

Development of an analytical method for white phosphorus (P_4) in water and sediment using solid-phase microextraction.

Walsh, M.E., Taylor, S., Thorne, P.G., SR 96-16, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Aug. 1996, 12p., ADA-317 623, 32 refs.

Water pollution, Soil pollution, Soil chemistry, Soil analysis, Water chemistry, Explosives, Chemical analysis

Headspace solid-phase microextraction (SPME) methods were developed for white phosphorus in water and sediment/soil to minimize waste generated by methods based on solvent extraction. Headspace SPME provided a rapid, non-exhaustive extraction, based on equilibrium, of white phosphorus. Comparison of results obtained by headspace SPME and solvent extraction shows that headspace SPME may be used quantitatively for some water matrices and qualitatively for more complex matrices such as sediment/soil. Because detection limits appear to be similar to those obtained by solvent extraction, headspace SPME can be used to rapidly screen samples for contamination, eliminating the need to solvent-extract most samples.

51-2049

Assessment of sampling error associated with collection and analysis of soil samples at explosives-contaminated sites.

Jenkins, T.F., Grant, C.L., Brar, G.S., Thorne, P.G., Ranney, T.A., Schumacher, P.W., SR 96-15, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Sep. 1996, 38p., ADA-318 015, 26 refs.

Soil pollution, Soil chemistry, Soil analysis, Soil tests, Explosives, Waste disposal, Statistical analysis

This study is an assessment of short-range heterogeneity in contaminant concentrations within surface soils at explosives-contaminated sites. Intensive sampling was conducted over short distances. Discrete and composite samples were analyzed by both on-site colorimetric methods and standard laboratory protocols. To improve the quality of site characterization data, emphasis should be placed on reducing sampling error by the use of composite sampling strategies. Characterization of explosives-contaminated sites using composite sampling, in-field sample homogenization, and on-site analysis is an efficient method of producing data that are accurate and precise, and also representative of the area.

51-2050

Establishing a relationship between passive soil vapor and grab sample techniques for determining volatile organic compounds.

Hewitt, A.D., SR 96-14, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Sep. 1996, 9p., ADA-318 014, 17 refs.

Soil pollution, Soil chemistry, Soil tests, Soil analysis, Chemical analysis

A passive soil vapor and an in-vial sample handling and analysis method were compared for estimating volatile organic compound (VOC) contamination in the near-surface vadose zone. These two methods of VOC site characterization, although very different operationally, established very similar trends for trichloroethylene (TCE) contamination. The correlation (r^2=0.944) of the results from these two methods shows a much better agreement than what has been reported between comparisons of in-vial methods (or solvent immersion) and conventional soil sample collection and handling methods often used for site characterization activities. The strong correlation between these two methods and from grab samples taken 15 cm apart indicates that this analyte is homogeneously distributed as compared to metals and semivolatile organic compounds. For contaminants such as TCE, soil vapor measurement technologies offer a promising means of estimating subsurface concentrations in locations where grab samples cannot be easily obtained.

51-2051

Ice action on riprap: small-scale tests.

Sodhi, D.S., Borland, S.L., Stanley, J.M., CR 96-12, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* Sep. 1996, 64p., ADA-318 069, 20 refs.

Bank protection (waterways), Rock fills, Ice push, Ice pileup, Ice override, Ice erosion, Ice pressure, Ice loads, Ice control, Environmental tests

The authors conducted 35 small-scale experiments to assess the damage on riprap-covered banks by ice shoving. A review of literature on this subject revealed very little experience or guidance available for the design of riprap in the cold regions, where presence of moving ice can cause substantial damage to a riprapped bank. During the experimental program, the authors changed the slope of the model riprap bank, the size and the mix of rocks, and the thickness of model ice sheets. Results of these tests are presented in terms of measured horizontal and vertical forces, outcome of interaction as pileup or ride-up events, and damage to the model riprap bank. From the observations made during the tests, the damage to the riprap appears to take place during pileup events, because the incoming ice sheet is forced to go between the riprap and the piled-up ice, bringing with it rocks from the bottom to the surface of an ice pile. To sustain no damage to the riprapped protective layer, maximum rock size (D_{100}) should be twice the ice thickness for shallow slopes (1V:3H) and about three times the ice thickness for steeper slopes (1V:1.5H).

51-2052

Sea ice. Part II. Estimating the full-scale tensile, flexural, and compressive strength of first-year ice.

Kovacs, A., CR 96-11, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* Sep. 1996, 17p., ADA-317 247, 29 refs. For Part 1 see 51-513.

Ice cover strength, Ice salinity, Ice density, Ice electrical properties, Ice loads, Ice pressure, Ice friction, Ice deformation, Ice creep, Ice breaking, Offshore structures, Mathematical models, Beaufort Sea

Sea-ice salinity, density, and temperature data were used to develop new methods for determining the bulk brine volume and porosity of sea-ice floes. Methods for estimating full-thickness ice sheet strength, based on large-scale field tests, are presented. The relationships among bulk sea-ice properties, strain rate, and strength are illustrated. A new constitutive equation was developed for predicting the full-thickness horizontal compressive strength of first-year sea ice as a function of the applied strain rate and bulk porosity. An estimate of the horizontal force that may develop between first-year sea ice and a 90-m wide structure is given. Estimating sea-ice strength based on remote ice conductivity measurements is also discussed conceptually.

51-2053

Structural mechanics solutions for butt joint seals in cold climates.

Ketcham, S.A., CR 96-10, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* Aug. 1996, 12p., ADA-318 060, 24 refs.

Joints (junctions), Sealing, Rubber, Polymers, Waterproofing, Weatherproofing, Structural analysis, Thermal analysis, Thermal stresses, Cold weather tests

An effective, formed-in-placed joint seal will respond with elastic or viscoelastic behavior over a reasonable design life to any large movement of the joint without adhesive or cohesive failure. For a given joint movement, seals with lower stiffness are most able to deform without cohesive or adhesive failure of the seal or of the structure to which it is bonded. It is in recognition of this desirable response feature that lower-modulus, rubber-based elastomeric materials have been formulated and promoted as joint sealants. For a seal formed from an elastomeric sealant, it should generally be expected that the modulus of elasticity will depend upon temperature and loading rate, such that the modulus increases (sometimes dramatically) with a reduction in temperature and an increase in loading rate, and it should be expected that the seal stiffness will depend upon the material modulus and the shape of the seal. Measurements from testing techniques that are routinely used to evaluate the temperature and rate-dependent mechanical properties of rubber-like materials, together with simple structural mechanics solutions for the load vs. deflection behavior of rubber in the configuration of rectangular-shaped joint seals, allow these dependencies to be modeled, and form the basis of a practical analysis technique that could be used by civil and mechanical engineers for sealant selection and seal design.

51-2054

Physical system dynamics and white phosphorus fate and transport, 1994, Eagle River Flats, Fort Richardson, Alaska.

Lawson, D.E., Hunter, L.E., Bigl, S.R., Nadeau, B.M., Weyrick, P.B., Bodette, J.H., CR 96-09, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* Aug. 1996, 63p., ADA-317 624, 53 refs.

Soil pollution, Water pollution, Estuaries, Water erosion, Sediment transport, Explosives, Environmental impact, Military facilities, Land reclamation, United States—Alaska—Fort Richardson

Eagle Rive Flats (ERF) is a subarctic estuarine salt marsh where human and natural forces are causing significant changes in the environment. Multiple internal and external forces govern the physical and chemical processes by actively altering surface conditions, sometimes in unpredictable ways. ERF is also used as an artillery range by the U.S. Army, where past use has resulted in white phosphorus (WP) contamination of the sediments within ponds and mudflats. Bottom-feeding waterfowl ingest this WP, which causes rapid death. This report documents analyses of the physical environment, describing the nature of the physical systems and factors controlling them. It includes data on sedimentation, erosion and hydrology. These investigations provide knowledge necessary to designing and evaluating remedial technologies. They also help determine the system's capacity to naturally attenuate the WP contamination.

51-2055

CRREL investigates extraterrestrial particles.

Darling, M., MP 3936, *Engineer update,* Dec. 1996, 20(12), p.2.

Cosmic dust, Impurities, Ice sampling, Wells, Antarctica—Amundsen-Scott Station

51-2056

Methods of preparing soil samples for headspace analysis of volatile organic compounds: emphasis on salting out.

Hewitt, A.D., MP 3937, Waste Testing and Quality Assurance Symposium, 12th, Washington, D.C., July 23-26, 1996. Proceedings, Washington, D.C., American Chemical Society, 1996, p.322-329, 12 refs.

Soil pollution, Soil tests, Soil chemistry, Soil analysis, Chemical analysis

Three equilibrium and two solvent extraction methods of preparing and analyzing volatile organic compounds (VOCs) in soil by headspace gas chromatography (HS/GC) were compared. The samples studied were triplicates of four different soil types spiked with an aqueous solution containing BTEX and four chlorinated compounds. Solvent extraction was found to be superior for recovering spiked VOCs, followed by: direct heating; an aqueous solution preserved with $NaHSO_4$; and lastly, an aqueous solution saturated with NaCl and acidified with phosphoric acid. The findings indicated that correction factors may be necessary for equilibrium HS/GC determinations of VOCs in soils.

51-2057

Guidance for characterizing explosives contaminated soils: sampling and selecting on-site analytical methods.

Crockett, A.B., Craig, H.D., Jenkins, T.F., Sisk, W.E., MP 3938, Waste Testing and Quality Assurance Symposium, 12th, Washington, D.C., July 23-26, 1996. Proceedings, Washington, D.C., American Chemical Society, 1996, p.37-43, 15 refs.

Soil pollution, Soil tests, Soil chemistry, Soil analysis, Explosives, Waste disposal

A large number of defense-related sites are contaminated with elevated levels of secondary explosives. Levels of contamination range from barely detectable to levels above 10% that need special handling due to the detonation potential. Characterization of explosives-contaminated sites is particularly difficult due to the very heterogeneous distribution of contamination in the environment and within samples. To improve site characterization, several options exist including collecting more samples, providing on-site analytical data to help direct the investigation, compositing samples, improving homogenization of samples, and extracting larger samples. On-site analytical methods are essential to more economical and improved characterization. On-site methods might suffer in terms of precision and accuracy, but this is more than offset by the increased number of samples that can be run.

51-2058

Sample representativeness: a necessary element in explosives site characterization.

Jenkins, T.F., Grant, C.L., Brar, G.S., Thorne, P.G., Schumacher, P.W., Ranney, T.A., MP 3939, Waste Testing and Quality Assurance Symposium, 12th, Washington, D.C., July 23-26, 1996. Proceedings, Washington, D.C., American Chemical Society, 1996, p.30-35, 4 refs.

Soil pollution, Soil tests, Soil chemistry, Soil analysis, Explosives, Waste disposal

Explosives-contaminated sites are generally characterized by collecting discrete grab samples of surface soil and shipping them to off-site laboratories for analysis. Decisions as to whether or not site remediation is needed are made based on the results of these analyses, assuming they represent site conditions over fairly large grids. This study was conducted to assess the degree of short-range heterogeneity in analyte concentrations present at explosives-contaminated sites. This information is essential if sampling methods are to be established that provide representative samples on which informed decisions can be based.

51-2059

Thumper.

Stanford, M., *Avalanche review,* Nov. 1996, 15(1), p.1,3.

Avalanche triggering, Blasting, Tanks (combat vehicles), United States—Washington

51-2060

Avalanche massacre of 1995-96.

Atkins, D., *Avalanche review,* Nov. 1996, 15(1), p.4.

Avalanches, Accidents, United States

51-2061

History of advanced avalanche training in the National Ski Patrol Central Division.

Krimen, L., *Avalanche review,* Nov. 1996, 15(1), p.5.

Avalanches, Avalanche forecasting, Safety, Rescue operations, Education, United States

51-2062

Effects of methods of slope packing as determined by the ram penetrometer.

Stillman, R.M., *Avalanche review,* Nov. 1996, 15(1), p.6-7, Reprinted from U.S. National Forest Service, Wasatch National Forest, Alta Avalanche Study Center, Miscellaneous report, No.5, 1962.

Avalanche forecasting, Snow cover stability, Snow hardness, Penetration tests, Penetrometers

51-2063

Physical modelling.

Wuebben, J.L., MP 3940, Primer on hydraulics of ice covered rivers. Edited by K.S. Davar, S. Beltaos, and B. Pratte, Ottawa, Environment Canada, Environmental Citizenship (Écocivisme), 1996, p.105-129, 37 refs. Chapter 6 in book. For another version see 50-789.

River ice, Ice cover strength, Ice breakup, Ice jams, Ice loads, Ice friction, Ice control, Ice models, River flow, Hydraulic structures, Environment simulation, Environmental tests

51-2064

Mineral investigations on Baranof and Chichagof islands, and vicinity, southeast Alaska, 1995.

Maas, K.M., Bittenbender, P.E., Still, J.C., *U.S. Bureau of Land Management. Alaska State Office. BLM-Alaska open file report,* Oct. 1996, No.60, 112p. + 2 maps in pocket, 342 refs.

Geological surveys, Exploration, Mining, Minerals, Geochemistry, Natural resources, United States—Alaska—Baranof Island, United States—Alaska—Chichagof Island

51-2065

Evaluation of cold mixes for winter pothole repair.

Prowell, B.D., Franklin, A.G., *Transportation research record,* 1996, No.1529, Work zone safety and pavement markings and materials, p.76-85, 10 refs. For another version see 50-2792.

Pavements, Bitumens, Road maintenance, Cold weather performance, Cost analysis

51-2066

Crack sealing in flexible pavements: a life-cycle cost analysis.

Ponniah, J.E., Kennepohl, G.J., *Transportation research record,* 1996, No.1529, Work zone safety and pavement markings and materials, p.86-94, 11 refs.

Pavements, Cracking (fracturing), Sealing, Waterproofing, Road maintenance, Cost analysis, Canada—Ontario

51-2067

Simplified rapid assessment approach to road network management.

Liautaud, G., Faiz, A., *Transportation research record,* 1996, No.1533, Maintenance management and winter operations, p.11-17, 4 refs.

Highway planning, Road maintenance, Pavements, Cost analysis, Computerized simulation, Peru

51-2068

Experiments with anti-icing in Washington State.

Dye, D.L., Krug, H.O., Keep, D., Willard, R., *Transportation research record,* 1996, No.1533, Maintenance management and winter operations, p.21-26.

Road icing, Road maintenance, Chemical ice prevention, Sanding, Cost analysis, United States—Washington

51-2069

Final results of Road Traffic in Winter project: socioeconomic effects of winter maintenance and studded tires.

Leppänen, A., *Transportation research record,* 1996, No.1533, Maintenance management and winter operations, p.27-31, 13 refs.

Road icing, Road maintenance, Salting, Tires, Skid resistance, Safety, Human factors, Cost analysis, Finland

51-2070

Experiment with reduced salting of rural main roads in Finland.

Kallberg, V.P., *Transportation research record,* 1996, No.1533, Maintenance management and winter operations, p.32-37, 10 refs.

Road icing, Salting, Sanding, Road maintenance, Safety, Accidents, Cost analysis, Finland

51-2071

Estimation of effects of reduced salting and decreased use of studded tires on road accidents in winter.

Kallberg, V.P., Kanner, H., Mäkinen, T., Roine, M., *Transportation research record,* 1996, No.1533, Maintenance management and winter operations, p.38-43, 13 refs.

Road icing, Road maintenance, Salting, Tires, Human factors, Safety, Accidents, Finland

51-2072

Snow and ice control system based on slipperiness data transmitted by drivers: usefulness of subjective slipperiness data.

Nakatsuji, T., Fujiwara, T., Hagawara, T., Onodera, Y., *Transportation research record,* 1996, No.1533, Maintenance management and winter operations, p.44-49, 7 refs.

Road icing, Skid resistance, Weather forecasting, Human factors, Safety, Road maintenance, Japan

51-2073

Deicing chemicals as source of constituents of highway runoff.

Granato, G.E., *Transportation research record,* 1996, No.1533, Maintenance management and winter operations, p.50-58, 26 refs.

Road icing, Road maintenance, Chemical ice prevention, Salting, Water pollution, Soil pollution

51-2074

Forward-lighting configurations for snowplows.

Bajorski, P., Dhar, S., Sandhu, D., *Transportation research record,* 1996, No.1533, Maintenance management and winter operations, p.59-66, 6 refs.

Snow removal equipment, Road maintenance, Motor vehicles, Illuminating, Visibility, Human factors engineering

51-2075

Snow road enhancement.

Diemand, D., Alger, R., Klokov, V., MP 3941, *Transportation research record,* 1996, No.1534, Geosynthetics: cold regions, flexible pavements, and other issues, p.1-4, 2 refs.

Snow roads, Snow (construction material), Snow compaction, Snow strength, Trafficability, Geotextiles, Cellular materials

Snow roads are used extensively in areas where seasonal access to remote areas would otherwise be difficult or impossible for wheeled vehicles. Forestry operations in Scandinavia and Canada, petroleum operations in Alaska and Canada, and almost all activities in Antarctica make extensive use of this technology. Many techniques of preparing snow roads and runways have been used and studied, but the most intractable problems remain unsolved: how to extend the service life of the road as the warm season approaches and how to bridge damaged or transitional sections. Other, less important problems include sinkage of parked vehicles, damage to heavily trafficked areas, damage caused by fluid spills and infiltration by saltwater, and use limited to vehicles with low tire pressures. Research addressing these problems was conducted, and the preliminary results are encouraging. A short test section of road was constructed with geocells. This material is designed for use with sand or gravel but, instead, the cells were filled with packed snow. The resulting surface was very hard, stable, and resistant to damage by repeated passes by wheeled traffic. Paving blocks were also prepared by converting snow directly to ice by using very high compaction pressures in a hydraulic press. The material was very strong and was resistant to the infiltration of fluids of all kinds. The application of these two techniques would greatly reduce most problems encountered in the use of snow roads and runways.

51-2076

Geotextiles to mitigate frost effects in soils: a critical review.

Henry, K.S., MP 3942, *Transportation research record,* 1996, No.1534, Geosynthetics: cold regions, flexible pavements, and other issues, p.5-11, 23 refs.

Subgrade soils, Soil freezing, Soil stabilization, Frost heave, Frost resistance, Frost protection, Thaw weakening, Geotextiles, Vapor barriers, Freeze thaw tests

The use of geotextiles to mitigate frost effects in soils has been studied, but few techniques have been developed. Guidelines developed for the placement of granular capillary barriers are presented to serve as preliminary guidelines for geotextile capillary barriers. Laboratory research shows that pore size distribution, wettability, and, for some geotextiles, thickness influence capillary barrier performance in a given soil. Geotextiles that easily wet do not reduce frost heave and may even exacerbate it. On the basis of the literature reviewed, guidance for selection of geotextile capillary barriers in field trials is given. If geotextiles function as capillary barriers during freezing and reinforce or separate and filter the subgrade at the base course interface during thaw, then the potential exists for their use in a combination of functions to reduce frost-related damage in geotechnical structures. It was found that properly designed geotextiles have the potential to reduce frost heave by functioning as capillary barriers, they can be filters for capillary barriers, and they can provide reinforcement or separation or filtration (or all of these) of the subgrade soil to reduce thaw-related damage.

51-2077

Efficiency of geosynthetic lateral drainage in northern climates.

Lafleur, J., Savard, Y., *Transportation research record,* 1996, No.1534, Geosynthetics: cold regions, flexible pavements, and other issues, p.12-18, 5 refs.

Subgrade soils, Soil stabilization, Soil freezing, Frost heave, Frost protection, Geotextiles, Vapor barriers, Subsurface drainage, Road maintenance

51-2078

Temperatures and related behavior in segmental retaining wall system.

Buttry, K.E., McCullough, E.S., Wetzel, R.A., *Transportation research record,* 1996, No.1534, Geosynthetics: cold regions, flexible pavements, and other issues, p.19-23, 6 refs.

Walls, Earth fills, Geotextiles, Soil stabilization, Soil pressure, Thermal stresses, Thermal insulation

51-2079

Temperatures of insulated landfill liner.

Benson, C.H., Olson, M.A., Bergstrom, W.R., *Transportation research record,* 1996, No.1534, Geosynthetics: cold regions, flexible pavements, and other issues, p.24-31, 14 refs.

Waste disposal, Earth fills, Geotextiles, Linings, Thermal insulation, Frost protection, Soil stabilization

51-2080

Frost-thaw effects on ballasted track.

Raymond, G.P., *Transportation research record,* 1996, No.1534, Geosynthetics: cold regions, flexible pavements, and other issues, p.32-39, 11 refs.

Subgrade soils, Soil stabilization, Railroad tracks, Settlement (structural), Frozen ground settling, Thaw weakening, Frost protection, Geotextiles, Thermal insulation, Canada—Alberta

51-2081

Scientific report of Ninth Indian Expedition to Antarctica.

India. Department of Ocean Development, New Delhi, India, 1994, 311p., Technical publication No.6, Refs. passim. For individual papers see B-56538 through B-56540, B-56548, B-56551, D-56533, E-56542 through E-56546, E-56548, F-56549, F-56550, G-56554 through G-56558, H-56552, H-56553, I-56536, I-56537, J-56541, K-56534, K-56535, L-56547 or 51-2082 through 51-2092.

Low temperature research, Research projects, Expeditions

This technical report gives details of the work carried out by members of the Ninth Indian Expedition to Antarctica, from Nov. 1989 to Mar. 1991, in the following disciplines: atmospheric and terrestrial physics, meteorology, biology, geology, glaciology and human physiology. Twenty-six papers are included; the first, and the last five, deal with the expedition's logistics.

51-2082

Establishment of a new meteorological observatory at Maitri and study of meteorological parameters, ozone depletion in antarctic spring and solar radiation during Ninth Antarctic Expedition.

Singh, S., Kulandaivelu, E., Scientific report of Ninth Indian Expedition to Antarctica, Technical publication No.6, New Delhi, India, Department of Ocean Development, 1994, p.35-56.

Snowstorms, Ozone, Solar radiation, Meteorological data, Meteorological instruments, Weather observations, Weather stations, Antarctica—Dakshin Gangotri Station, Antarctica—Maitri Station

India Meteorological Department established its full-fledged meteorological observatory at Maitri Station in Jan. 1990 and discontinued meteorological observations at Dakshin Gangotri Station. Details of the installation of meteorological instruments and of the tabulated data collected during 1989, and from Jan. 1990 to Jan.1991, are discussed.

51-2083

Comparative study of the variability in the observed ozone and that obtained from a statistical model of catalytic destruction over Antarctica.

Pasricha, P.K., Scientific report of Ninth Indian Expedition to Antarctica, Technical publication No.6, New Delhi, India, Department of Ocean Development, 1994, p.57-64, 16 refs.

Ozone, Atmospheric composition, Mathematical models, Antarctica—Maitri Station

Day-to-day fluctuations in total ozone during the ozone hole period (using the TOMS data) over the Maitri Station are presented. A statistical correlation analysis is performed to reveal a characteristic correlation period (T_0) in the fluctuations. The extent of the effective data sample (T) to be analyzed is given. A value of σ_T during the ozone hole period of Sep. 1987 is found to be about 6 D.U., which is 3 D.U. above the noise rms associated with the TOMS data. The signal rms variability of 3 D.U. estimated in the ozone hole period is compared with the statistical fluctuations inherent in the process of destruction of ozone through chlorine and bromine catalysis in the lower stratosphere. The resultant rms variability in the mean ozone level requires the values of T_0 and T, and is also shown to be about 3 D.U. The fluctuations in total ozone in other non- ozone hole months are analyzed. (Auth. mod.)

51-2084

Geotechnical appreciation of soil and rocks of Schirmacher Hills, East Antarctica.

Pathak, R.C., Scientific report of Ninth Indian Expedition to Antarctica, Technical publication No.6, New Delhi, India, Department of Ocean Development, 1994, p.195-207, Refs. p.206-207.

Engineering geology, Cold weather construction, Cryogenic soils, Frozen ground, Terrain identification, Antarctica—Schirmacher Hills, Antarctica—Maitri Station

The Indian permanent station, Maitri, was constructed during the Seventh (1987-88) and Eighth (1988-89) Indian Antarctica Expeditions. A concerted effort towards geotechnical appreciation of the area was made during the 9th expedition, by evaluating the physical and strength properties of soil and rocks around the station. These geotechnical parameters are important in so far as the foundation, water management and waste disposal systems are concerned. (Auth.)

51-2085

Terminal moraines in Grautfatet, Humboldt Mountain, East Antarctica - Indicators of rate of glacier recession.

Pant, N.C., Ravindra, R., D'Souza, M.J., Scientific report of Ninth Indian Expedition to Antarctica, Technical publication No.6, New Delhi, India, Department of Ocean Development, 1994, p.219-225, 10 refs.

Glacial geology, Geomorphology, Moraines, Glacier flow, Glacial deposits, Glacier melting, Flow rate, Antarctica—Schüssel Moraine

The Schüssel Cirque is a vast, morainal flat within the Humboldt Mountains. The Somovken glacier branching into the Cirque and Humboldt glaciers has controlled the deposition of terminal moraines in this flat. The disposition of the two sets of terminal moraines, along with the relief pattern of the surrounding ridges have been used to decipher an ice level lowering of 350 to 400 m and a retreat of Somovken glacier by 7.5 km since the last peak ice condition. This recession, in conjunction with the inferred age of last peak ice condition, indicates an average retreat rate of 75/m/100 y for Somovken glacier. (Auth.)

51-2086

Observation on the snow accumulation/ablation over shelf and continental ice in parts of central Dronning Maud Land, East Antarctica.

Ravindra, R., Dey, A., Beg, M.J., Kaul, M.K., Scientific report of Ninth Indian Expedition to Antarctica, Technical publication No.6, New Delhi, India, Department of Ocean Development, 1994, p.227-238, 4 refs.

Ice shelves, Ice sheets, Snow accumulation, Ablation, Antarctica—Queen Maud Land

Snow accumulation and ablation patterns over shelf and continental ice in central parts of Queen Maud Land were studied during the summers of 1989-1991 and the winter of 1990. While there was negligible addition on the shelf ice near Dakshin Gangotri Station between Dec. 1989 and Mar. 1990, the period between Mar. and end of Oct. 1990 recorded a rise in accumulation of the order of 15.9 gm/cm^2. Ablation of 10.3 gm/cm^2 was recorded in the summer of 1990-1991. A year-long profile of the snow surface between Maitri and Dakshin Gangotri stations has revealed a marked accumulation beyond the grounding line when compared to the area close to the Schirmacher Ponds. The stake data collected over the continental ice between Maitri Station and northern Humboldt Mountains has shown heavy accumulation (average 32.5 gm/cm^2) during winter of 1990 and ablation of 7.4 gm/cm^2 in the 1st month of the following summer. (Auth. mod.)

51-2087

Monitoring of icebergs in antarctic waters and a note on the secular movement of Dakshin Gangotri glacier.

Ravindra, R., Shrivastava, V.K., Sharma, B.L., Dey, A., Bedi, A.K., Scientific report of Ninth Indian Expedition to Antarctica, Technical publication No.6, New Delhi, India, Department of Ocean Development, 1994, p.239-249, 3 refs.

Icebergs, Sea ice distribution, Glacier oscillation, Glacier flow, Antarctica—Dakshin Gangotri Station

Iceberg monitoring in antarctic waters, during the Ninth Indian Antarctic Expedition, has revealed concentration of icebergs in two well defined zones. Distribution patterns and analyses of size-shape parameters have shown that the majority of large sized (>500 m), tabular icebergs are concentrated in the area close to the antarctic coastline, as compared to the pinnacled and/or disintegrating icebergs (of <500 m class) which show relative abundance between 51° and 60°S. A marked similarity in the distribution patterns of the icebergs during successive voyages has been noticed. Monitoring of the snout of Dakshin Gangotri glacier during austral summer of 1991 and its comparison with the results of earlier studies, reveals minor oscillation of the frontal part of the snout and the proglacial lake at its foot. (Auth.)

51-2088

Life support systems at Indian antarctic station: Maitri.

Gangadhara, R.S., Scientific report of Ninth Indian Expedition to Antarctica, Technical publication No.6, New Delhi, India, Department of Ocean Development, 1994, p.275-282.

Stations, Logistics, Electric heating, Water supply, Fuels, Waste disposal, Equipment, Antarctica—Maitri Station

The life support systems at Maitri Station, comprising central heating, electricity generation and supply, water supply and waste disposal systems are run and maintained throughout the year. The various equipment used and procedural details are discussed. (Auth.)

51-2089

On the construction of shelter accommodation within C & N Hangar, Dakshin Gangotri, Antarctica.

Raka, A.S., Scientific report of Ninth Indian Expedition to Antarctica, Technical publication No.6, New Delhi, India, Department of Ocean Development, 1994, p.283-286.

Cold weather construction, Shelters, Snow compaction, Design, Cargo, Storage, Antarctica—Dakshin Gangotri Station

Operations at Dakshin Gangotri Station, the first Indian antarctic station, were discontinued in 1989 and the station was converted into a supply base during Feb. 1990. Since regular wintering convoys would visit the station for ferrying the fuel and other cargo, it was envisaged to construct a 'Transit Accommodation' for eight personnel members within the existing C&N Hangar at the station. This hangar constructed during the Fourth Indian Expedition in 1984 to serve as a vehicle shelter, is completely buried in the snow at present. It is a well designed unit equipped with all communication facilities. (Auth. mod.)

51-2090

Communication during Ninth Expedition.

Vishwanathan, S., Scientific report of Ninth Indian Expedition to Antarctica, Technical publication No.6, New Delhi, India, Department of Ocean Development, 1994, p.287-290.

Radio communication, Equipment, Stations, Antarctica—Dakshin Gangotri Station, Antarctica—Maitri Station

The major task of the communications team of the 9th Indian antarctic expedition was to dismantle and shift communication equipment from the Dakshin Gangotri Station to Maitri Station. This was accomplished during Feb. 1990. Much of the material was transported by surface convoys, leaving behind some equipment in a hangar at Dakshin Gangotri, including the frames of 5KW Txs; the units themselves were transported to Maitri Station. Various types of communication linking Maitri Station with the outside world are described.

51-2091

Surface transport over snow and ice terrain in Antarctica.

Singh, B., Scientific report of Ninth Indian Expedition to Antarctica, Technical publication No.6, New Delhi, India, Department of Ocean Development, 1994, p.291-298.

Fuel transport, Cargo, Snow vehicles, Cold weather performance, Antarctica—Dakshin Gangotri Station, Antarctica—Maitri Station, Antarctica—Wohlthat Mountains

Haulage of fuel and cargo from the shelf and Dakshin Gangotri Station to India's permanent antarctic station, Maitri, involves surface transport over 130 km of snow and ice. During the austral winter of 1990, the 7th Indian wintering team operated 7 convoys to Dakshin Gangotri Station and 2 to the Wohlthat Mountains. Convoy details and description of the vehicles used, and their performance, are given.

51-2092

Some constructional, environmental control and plant growth aspects of green house at Indian antarctic station "Maitri".

Pathak, R.C., Gangadhara, R.S., Scientific report of Ninth Indian Expedition to Antarctica, Technical publication No.6, New Delhi, India, Department of Ocean Development, 1994, p.299-311, 5 refs.

Plants (botany), Climate control, Introduced plants, Cold weather construction, Modular construction, Antarctica—Maitri Station

During the 9th Indian expedition, a greenhouse was added to the main building of Maitri Station for the purpose of growing ornamental plants and some green vegetables on an experimental basis. The size of the greenhouse is 10.6 x 2.66 m; its location is such as to get a maximum sunlight-through-glass-house effect. Principle of modular construction has been adopted for selection of the size and structural components. An environmental control system, to simulate conditions suitable for plant growth in the severe climatic conditions of Antarctica, has been incorporated in the greenhouse. Temperature, humidity, oxidation, carbon dioxide, illumination, air change and pH value have been kept in mind while designing the systems. Construction details and plant growth data are given.

51-2093

Report 1994/1995.

Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany, Alfred Wegener Institute for Polar and Marine Research, 1996, 275p., Publications generated by the science programs during the reporting period are listed on p.236-265.

Research projects, Atmospheric composition, Sea ice, Marine biology

The aim of scientific work carried out by the Alfred Wegener Institute is to identify and describe the main physical, chemical and biological processes in the polar regions, and to assess their importance for the global environment. This leads to close interaction and cross-fertilization between field investigations and numerical modelling. The conclusions arrived at through field work form the basis for numerical modelling of scenarios. With the help of the latter, it is possible to describe natural and anthropogenic environmental changes, and to assess potential long-term impacts. The research topics currently addressed at the Institute are grouped into the following three major areas: the coupled ocean-atmosphere-cryosphere system, marine ecosystems and the sediments of the polar seas and their continental boundaries. These three general research fields are investigated by the various scientific sections, each of which is dedicated to a specific discipline.

51-2094

Polar and glacial world.

Sugden, D., Totowa, NJ, Barnes and Noble Books, 1987, p.214-231, In "Horizons in physical geography", edited by M.J. Clark, K.J. Gregory, and A.M. Gurnell. 7 refs.

DLC GB54.5.H67 1987

Polar regions, Ice sheets, Oscillations, Geochronology

This review has focused on polar ice-sheets, whose inception and subsequent oscillations are the key to the creation and stability of today's polar environment. Oscillations of the ice-sheets which have characterized the Pleistocene Ice Age are the result of the amplification of orbitally induced cycles of solar radiation receipt. The response, which is complex, involves distinct ice-sheet components whose size and location determines their response to different limiting variables. Most progress in understanding ice-sheets has occurred in the last thirty years, based on the large-scale approach, the bold use of hypotheses, explicit use of assumptions and an interdisciplinary outlook. Both the intellectual and practical importance of the subject, and the freshness of its approach, fully justify its recognition as one of the highlights of physical geography over the past two decades.

51-2095

Geophysiology of natural marine sulfate aerosols.

Anderson, T.L., Charlson, R.J., *Atmospheric environment,* 1991, 25A(11), p.2445-2447, 34 refs.

DLC TD881.A818

Plankton, Water chemistry, Suspended sediments, Ice cores, Antarctica—Vostok Station

The hypothesis suggesting dimethyl sulfide (DMS) from oceanic phytoplankton as the dominant natural worldwide source of cloud condensation nuclei (CCN) is being tested in several ways. Studies ranging from the perturbation of cloud albedo by ship plumes to the sulfur content of antarctic ice cores have revealed much about the workings of the natural marine sulfur cycle and the mass flux of DMS-derived sulfur compounds. However, quantifying the relationship between DMS mass flux, or sulfate mass concentration, and CCN number remains as a major challenge. (Auth.)

51-2096

Genetic variation in populations of the arctic perennial *Pedicularis dasyantha* (Scrophulariaceae), on Svalbard, Norway.

Odasz, A.M., Savolainen, O., *American journal of botany,* Nov. 1996, 83(11), p.1379-1385, 53 refs.

Plants (botany), Plant ecology, Arctic landscapes, Vegetation patterns, Plant physiology, Plant tissues, Chemical analysis, Sampling, Statistical analysis, Norway—Svalbard

51-2097

Holocene tree-limit and climate history from the Scandes Mountains, Sweden.

Kullman, L., *Ecology,* Dec. 1995, 76(8), p.2490-2502, Refs. p.2500-2502.

Forest ecosystems, Plant ecology, Paleoclimatology, Climatic changes, Insolation, Paleoecology, Subpolar regions, Forest lines, Vegetation patterns, Biomass, Sediments, Radioactive age determination, Statistical analysis, Sweden—Scandes Mountains

51-2098

Long-term stability of the boreal forest limit in subarctic Québec.

Lavoie, C., Payette, S., *Ecology,* June 1996, 77(4), p.1226-1233, 66 refs.

Paleoecology, Paleoclimatology, Subarctic landscapes, Peat, Soil analysis, Climatic changes, Forest ecosystems, Forest lines, Tundra terrain, Tundra vegetation, Vegetation patterns, Forest lines, Stability, Radioactive age determination, Periodic variations, Correlation, Canada—Quebec

51-2099

Luxury uptake and storage of nitrogen in the rhizomatous alpine herb, *Bistorta bistortoides*.

Lipson, D.A., Bowman, W.D., Monson, R.K., *Ecology,* June 1996, 77(4), p.1277-1285, 32 refs.

Tundra vegetation, Plant ecology, Alpine tundra, Nutrient cycle, Meadow soils, Biomass, Plant tissues, Structural analysis, Sampling, Chemical analysis, Statistical analysis

51-2100

Secret of ice's slippery character.

Kestenbaum, D., *New scientist,* Dec. 21-28, 1996, 152(2061-2), p.16.

Ice physics, Sliding, Viscosity, Ice water interface, Surface properties, Water films, Scanning electron microscopy, Hydrogen bonds, Molecular energy levels, Vibration

51-2101

Icy stare. *New scientist,* Dec. 21-28, 1996, 152(2061-2), p.23, UK patent application 2 299 358.

Road icing, Sensors, Surface temperature, Ice detection, Temperature measurement, Light transmission, Warning systems

51-2102

From processing cosmic ices to optical communications.

Brown, W.L., *Nuclear instruments and methods in physics research B,* Aug. 1996, 116(1-4), International Conference on Radiation Effects in Insulators, 8th, Catania, Italy, Sep. 11-15, 1995, p.1-12, 17 refs.

Ice physics, Extraterrestrial ice, Ice dielectrics, Insulation, Ionization, Gamma irradiation, Radiation absorption, Molecular energy levels, Semiconductors (materials), Optical filters, Radio communication, Correlation

51-2103

Structural characteristic of irradiated and unirradiated ices.

Leto, G., Palumbo, M.E., Strazzulla, G., *Nuclear instruments and methods in physics research B,* Aug. 1996, 116(1-4), International Conference on Radiation Effects in Insulators, 8th, Catania, Italy, Sep. 11-15, 1995, p.49-52, 25 refs.

Ice physics, Extraterrestrial ice, Ice spectroscopy, Infrared spectroscopy, Spectra, Ice structure, Profiles, Radiation absorption, Phase transformations, Simulation

51-2104

Implantation of reactive and unreactive ions in silicates and ices.

Strazzulla, G., Brucato, J.R., Palumbo, M.E., Satorre, M.A., *Nuclear instruments and methods in physics research B,* Aug. 1996, 116(1-4), International Conference on Radiation Effects in Insulators, 8th, Catania, Italy, Sep. 11-15, 1995, p.289-293, 15 refs.

Extraterrestrial ice, Ice physics, Gamma irradiation, Radiation absorption, Ionization, Infrared spectroscopy, Ice spectroscopy, Spectra, Adsorption, Phase transformations, Solar radiation, Simulation

51-2105

Deice salt scaling resistance of steel-fiber-reinforced concrete.

Cantin, R., Pigeon, M., *Cement and concrete research,* Nov. 1996, 26(11), p.1639-1648, 9 refs.

Reinforced concretes, Composite materials, Concrete slabs, Concrete durability, Frost resistance, Chemical ice prevention, Degradation, Freeze thaw tests, Freezing points, Temperature effects, Air entrainment, Winter concreting

51-2106

CO_2 cycling in the coastal ocean. II. Seasonal organic loading of the Arctic Ocean from source waters in the Bering Sea.

Walsh, J.J., et al, *Continental shelf research,* Jan. 1997, 17(1), p.1-36, Refs. p.32-36.

Oceanography, Water transport, Sediment transport, Subpolar regions, Water chemistry, Carbon dioxide, Dispersions, Geochemical cycles, Ice cover effect, Sea ice distribution, Seasonal variations, Statistical analysis, Models, Arctic Ocean, Bering Sea

51-2107

On the role of mechanical interactions in the steady-state gravity flow of a two-constituent mixture down an inclined plane.

Svendsen, B., Wu, T., Jöhnk, K., Hutter, K., *Royal Society of London. Proceedings. Series A,* May 8, 1996, 452(1948), p.1189-1205, 20 refs.

Glaciology, Glacier flow, Viscous flow, Velocity measurement, Glacial geology, Ice solid interface, Sedimentation, Gravity, Rheology, Saturation, Mathematical models, Thermodynamics

51-2108

Thermal conductivity of porous ice in hailstone shells.

Zheng, G.G., List, R., *Journal of glaciology,* 1996, 42(141), p.195-200, 29 refs.

Ice physics, Cloud physics, Hailstone structure, Hailstone growth, Thermal conductivity, Thermal diffusion, Ice heat flux, Porosity, Surface temperature, Temperature distribution, Ice air interface, Simulation

51-2109

Temperate ice permeability, stability of water veins and percolation of internal meltwater.

Lliboutry, L., *Journal of glaciology,* 1996, 42(141), p.201-211, 27 refs.

Glacial hydrology, Ice physics, Ice thermal properties, Glacier ice, Ice structure, Ice deterioration, Permeability, Meltwater, Capillarity, Seepage, Ice water interface, Mathematical models

51-2110

Diagnosing the imbalance of Glaciar Santa Rosa, Cordillera Raura, Peru.

Ames, A., Hastenrath, S., *Journal of glaciology*, 1996, 42(141), p.212-218, 14 refs.

Glacier mass balance, Glacial hydrology, Mountain glaciers, Glacier surveys, Topographic surveys, Profiles, Glacier flow, Velocity measurement, Ice volume, Glacier melting, Periodic variations, Climatic factors, Peru—Santa Rosa Glacier

51-2111

Seismic-reflection evidence for a deep subglacial trough beneath Jakobshavns Isbræ, West Greenland.

Clarke, T.S., Echelmeyer, K., *Journal of glaciology*, 1996, 42(141), p.219-232, 39 refs.

Glacial geology, Glacier flow, Subglacial observations, Seismic reflection, Glacial erosion, Radio echo soundings, Bedrock, Crevasses, Basal sliding, Ice solid interface, Ice cover thickness, Shear stress, Topographic features, Greenland—Jakobshavns Isbræ

51-2112

Water storage and subglacial drainage conditions inferred from borehole measurements on Gornergletscher, Valais, Switzerland.

Iken, A., Fabri, K., Funk, M., *Journal of glaciology*, 1996, 42(141), p.233-248, 17 refs.

Mountain glaciers, Glacial hydrology, Meltwater, Subglacial drainage, Channels (waterways), Boreholes, Flow measurement, Water storage, Turbulent flow, Laminar flow, Damping, Oscillations, Analysis (mathematics), Switzerland—Gornergletscher

51-2113

Sea-ice motion in the Weddell Sea from drifting-buoy and AVHRR data.

Crane, D., Wadhams, P., *Journal of glaciology*, 1996, 42(141), p.249-254, 15 refs.

Sea ice distribution, Pack ice, Ice mechanics, Drift, Ice openings, Drift stations, Air ice water interaction, Ice mechanics, Wind factors, Spaceborne photography, Radiometry, Antarctica—Weddell Sea

A study of sea ice in the northern Weddell Sea was done, relating the ice motion, determined using an array of satellite-tracked drifters, deployed into ice floes, to parameters describing the nature of the ice cover, obtained from an analysis of Advanced Very High Resolution Radiometer imagery. It was found that the ice motion was predominantly wind-driven, responding to the passage of low-pressure systems across the area. The nature of the ice motion was found to depend upon the lead parameters, with low values of pure convergence and divergence and larger values of vorticity and deformation of the ice field. The vorticity was found to be well correlated with the atmospheric pressure, with a time lag of less than 3 h, implying an almost instantaneous response of the ice cover to meteorological forcing. (Auth. mod.)

51-2114

Impurity influence on normal grain growth in the GISP2 ice core, Greenland.

Alley, R.B., Woods, G.A., *Journal of glaciology*, 1996, 42(141), p.255-260, 33 refs.

Ice sheets, Ice cores, Drill core analysis, Ice growth, Impurities, Fallout, Aerosols, Ice microstructure, Grain size, Stratification, Sampling, Thin sections, Statistical analysis, Greenland

51-2115

Structural evolution of Variegated Glacier, Alaska, U.S.A., since 1948.

Lawson, W., *Journal of glaciology*, 1996, 42(141), p.261-270, 25 refs.

Glacier oscillation, Glacier surges, Ice mechanics, Periodic variations, Glacier surveys, Photointerpretation, Crevasse detection, Shear properties, Mass transfer, Coalescence, Structural analysis, United States—Alaska—Variegated Glacier

51-2116

Melting, runoff and the formation of frozen lakes in a mixed snow and blue-ice field in Dronning Maud Land, Antarctica.

Winther, J.G., Elvehøy, H., Bøggild, C.E., Sand, K., Liston, G., *Journal of glaciology*, 1996, 42(141), p.271-278, 18 refs.

Icebound lakes, Lake ice, Ice formation, Ice melting, Runoff, Subglacial drainage, Colored ice, Ice air interface, Radiant cooling, Antarctica—Queen Maud Land

Large-scale melting phenomena such as meltwater drainage channels and meltwater accumulation basins or frozen lakes were surveyed on the land ice mass in Jutulgryta, Queen Maud Land, during the Norwegian Antarctic Research Expedition in 1989-90. The largest frozen lake that was observed was close to 1 km in width. These melting features were also detected in a Landsat Thematic Mapper image recorded on Feb. 12, 1990. Then, during 1993-94, a 5-year glaciological program was started in this area. In spite of negative air temperatures and the presence of a frozen ice surface, sub-surface melting and runoff were found within the uppermost meter in blue-ice fields. The subsurface melting is a consequence of solar radiative penetration and absorption within the ice, i.e. the "solid-state-greenhouse effect". Temperatures in blue ice were about 6°C higher than for snow. Studies of how melting features change with time can be valuable indicators of climate change. This ongoing program identifies the importance of analyzing how these melting features originate, of mapping their present areal distribution, of determining how sensitive they are to climate change and of studying changes in the past and possible changes in the future. (Auth. mod.)

51-2117

Interferometric radar observations of Glaciar San Rafael, Chile.

Rignot, E., Forster, R., Isacks, B., *Journal of glaciology*, 1996, 42(141), p.279-291, 37 refs.

Mountain glaciers, Glacier surveys, Spaceborne photography, Synthetic aperture radar, Radar photography, Sensor mapping, Glacier flow, Velocity measurement, Topographic features, Image processing, Resolution, Polarization (waves), Chile—San Rafael Glacier

51-2118

Determination of timing and location of water movement and ice-layer formation by temperature measurements in sub-freezing snow.

Pfeffer, W.T., Humphrey, N.F., *Journal of glaciology*, 1996, 42(141), p.292-304, 39 refs.

Snow hydrology, Glacial hydrology, Metamorphism (snow), Wettability, Snow temperature, Heat loss, Snowmelt, Meltwater, Seepage, Water transport, Regelation, Stratification, Temperature measurement, Ice water interface, Stratigraphy

51-2119

Modelling albedo and specific balance of the Greenland ice sheet: calculations for the Søndre Strømfjord transect.

Zuo, Z., Oerlemans, J., *Journal of glaciology*, 1996, 42(141), p.305-317, 30 refs.

Glacier oscillation, Glacier mass balance, Profiles, Albedo, Glacial meteorology, Glacier ablation, Heat balance, Insolation, Radiation absorption, Mathematical models, Temperature effects, Snow ice interface, Greenland—Søndre Strømfjord

51-2120

Avalanche forecasting—an expert system approach.

Schweizer, J., Föhn, P.M.B., *Journal of glaciology*, 1996, 42(141), p.318-332, 37 refs.

Avalanche forecasting, Computerized simulation, Computer programs, Computer applications, Models, Statistical analysis, Data processing, Accuracy, Performance, Meteorological factors, Snow cover stability

51-2121

Visible and near-infrared reflectivity during the ablation period on Peyto Glacier, Alberta, Canada.

Cutler, P.M., Munro, D.S., *Journal of glaciology*, 1996, 42(141), p.333-340, 40 refs.

Glacier mass balance, Glacier ablation, Ice composition, Impurities, Solar radiation, Reflectivity, Albedo, Ice optics, Snow optics, Spectra, Topographic effects, Canada—Alberta—Peyto Glacier

51-2122

Glacier change in northern Sweden from AD 500: a simple geometric model of Storglaciären.

Raper, S.C.B., Briffa, K.R., Wigley, T.M.L., *Journal of glaciology*, 1996, 42(141), p.341-351, 22 refs.

Glacier mass balance, Ice volume, Glacier oscillation, Periodic variations, Air temperature, Climatic changes, Temperature effects, Mathematical models, Sweden—Storglaciären

51-2123

First results from a pre-operational system for automatic detection and recognition of seismic signals associated with avalanches.

Leprettre, B.J.P., Navarre, J.P., Taillefer, A., *Journal of glaciology*, 1996, 42(141), p.352-363, 9 refs.

Safety, Warning systems, Avalanche forecasting, Sensors, Snow cover stability, Snow mechanics, Remote sensing, Seismology, Wave propagation, Detection, Classifications, Design, Telemetering equipment, Data processing

51-2124

Surface albedo of the Greenland ice sheet: satellite-derived and in situ measurements in the Søndre Strømfjord area during the 1991 melt season.

Knap, W.H., Oerlemans, J., *Journal of glaciology*, 1996, 42(141), p.364-374, 30 refs.

Ice sheets, Glacier ablation, Glacier surveys, Spaceborne photography, Albedo, Radiometry, Image processing, Surface properties, Classifications, Statistical analysis, Greenland—Søndre Strømfjord

51-2125

Tidewater calving.

Van der Veen, C.J., *Journal of glaciology*, 1996, 42(141), p.375-385, 44 refs.

Glacial hydrology, Calving, Photogrammetric surveys, Grounded ice, Glacier flow, Velocity measurement, Glacier ablation, Glacier oscillation, Ice water interface, Correlation, Statistical analysis, United States—Alaska—Columbia Glacier

51-2126

Reply to the comments of Frochoso and Castañón on "Glaciers in Picos de Europa, Cordillera Cantábrica, northwest Spain" by González Suárez and Alonso.

González Suárez, J.J., Alonso, V., *Journal of glaciology*, 1996, 42(141), p.386-389, 6 refs. For pertinent paper see 50-463.

Mountain glaciers, Glacier oscillation, Glacier thickness, Glacier ablation, Glacier surveys, Ice edge, Terminology, Classifications, Climatic factors, Spain

51-2127

Compilation of long-term glacier-fluctuation data in China and a comparison with corresponding records from Switzerland.

Ding, Y.J., Haeberli, W., *Journal of glaciology*, 1996, 42(141), p.389-400, 47 refs.

Glacier oscillation, Glacier surveys, Glacier mass balance, Ice edge, Periodic variations, Long range forecasting, Statistical analysis, Correlation, Climatic factors, China, Switzerland

51-2128

Search dogs in the ski area environment.

Gamble, S., *Avalanche review*, Dec. 1996, 15(2), p.1,3.

Avalanches, Accidents, Rescue operations, Animals, Human factors

51-2129

Avalanches at Rogers Pass.

Schaerer, P., *Avalanche review*, Dec. 1996, 15(2), p.4-5.

Avalanches, Avalanche tracks, Avalanche deposits, Avalanche forecasting, Avalanche engineering, Canada—British Columbia—Roger's Pass

51-2130

Changes at the National Weather Service may have dramatic effects on avalanche forecasting.

Judson, A., *Avalanche review*, Dec. 1996, 15(2), p.6.

Avalanche forecasting, Snowstorms, Weather forecasting, Weather stations, Legislation, Regional planning, Labor factors, United States

51-2131

Winter-time hydrologic modeling over a three dimensional landscape.

Walter, M.T., Pullman, Washington State University, 1995, 97p., University Microfilms order No.DA9632275, Ph.D. thesis. Refs. p.87-94.

Snow hydrology, Snowmelt, Snow cover effect, Seepage, Soil freezing, Ground thawing, Frozen ground thermodynamics, Soil water migration, Watersheds, Runoff forecasting, Mathematical models, Computer programs

51-2132

Statistical characterization of ice jams in Canadian rivers.

Emissa, G., Montreal, Concordia University, 1994, 189p., M.S. thesis. 284 refs.

River ice, Freezeup, Ice breakup, Ice jams, Ice forecasting, Data processing, Statistical analysis, Canada

51-2133

Ice jam dynamics.

Zufelt, J.E., MP 3951, Iowa City, University of Iowa, 1996, 230p., University Microfilms order No.DA9629745, Ph.D. thesis. 26 refs.

River ice, Ice jams, Freezeup, Ice breakup, Ice friction, Ice pressure, Ice pileup, Ice deformation, Ice cover thickness, Ice water interface, Ice models, Ice forecasting, River flow, Mathematical models, Computer programs

51-2134

Winter Maintenance Program: plans for *Snow and ice control guide* and *Snow and Ice Pooled Fund Cooperative Program* (SICOP); final report.

Byrd, L.G., Washington, D.C., American Association of State Highway and Transportation Officials (AASHTO), June 1996, 18p. + appends., 4 refs. Prepared for the National Research Council, Transportation Research Board, National Cooperative Highway Research Program.

Road icing, Snow removal, Road maintenance, Highway planning, Research projects, Cost analysis, United States

51-2135

Arctic breakthrough.

Belt, D., *National geographic*, Feb. 1997, 191(2), p.36-57, Joint U.S.-Russian Arctic Ocean Atlas CD-ROM to be available from User Services, National Snow and Ice Data Center (NSIDC), CIRES Campus Box 449, University of Colorado, Boulder, CO 80309-0449.

Oceanographic surveys, Ice surveys, Sea ice, Drift stations, Research projects, International cooperation, Data processing

51-2136

Workshop on the Calving Rate of West Greenland Glaciers in Response to Climate Change, Copenhagen, Denmark, Sep. 13-15, 1993.

Reeh, N., ed, Copenhagen, Danish Polar Center, 1994, 27p. + 171p., Refs. passim. Consists of an introductory report and the appendix which contains the papers. For individual papers see 51-2137 through 51-2148.

Glacial meteorology, Glacier oscillation, Glacier flow, Calving, Icebergs, Global warming, Greenland

51-2137

Introduction.

Reeh, N., Workshop on the Calving Rate of West Greenland Glaciers in Response to Climate Change, Copenhagen, Denmark, Sep. 13-15, 1993. Edited by N. Reeh, Copenhagen, Danish Polar Center, 1994, p.11-27, 24 refs.

Glacier oscillation, Glacial meteorology, Calving, Icebergs, Global warming, Greenland

51-2138

West Greenland climate records over the past 100 years based on instrumental observations.

Frich, P., Workshop on the Calving Rate of West Greenland Glaciers in Response to Climate Change, Copenhagen, Denmark, Sep. 13-15, 1993. Edited by N. Reeh, Copenhagen, Danish Polar Center, 1994, p.1-6, 5 refs.

Glacial meteorology, Calving, Icebergs, Climatic changes, Climatic factors, Meteorological data, Statistical analysis, Greenland

51-2139

Climatic change and decay of the Greenland ice sheet at the end of the ice age.

Funder, S., Workshop on the Calving Rate of West Greenland Glaciers in Response to Climate Change, Copenhagen, Denmark, Sep. 13-15, 1993. Edited by N. Reeh, Copenhagen, Danish Polar Center, 1994, p.8-15, 23 refs.

Glacier oscillation, Glacial meteorology, Glacial geology, Calving, Marine geology, Moraines, Paleoclimatology, Global warming, Geochronology, Greenland

51-2140

Modelled and measured englacial temperatures in Jakobshavns Isbrae: conclusions on vertical strain in the ice stream.

Echelmeyer, K., Funk, M., Iken, A., Workshop on the Calving Rate of West Greenland Glaciers in Response to Climate Change, Copenhagen, Denmark, Sep. 13-15, 1993. Edited by N. Reeh, Copenhagen, Danish Polar Center, 1994, p.17-19, 8 refs.

Glacier flow, Glacier friction, Ice temperature, Ice deformation, Computerized simulation, Greenland

51-2141

Plan to model iceberg outbursts from Greenland outlet glaciers in response to greenhouse warming.

Fastook, J.L., Hughes, T.J., Workshop on the Calving Rate of West Greenland Glaciers in Response to Climate Change, Copenhagen, Denmark, Sep. 13-15, 1993. Edited by N. Reeh, Copenhagen, Danish Polar Center, 1994, p.21-55, 54 refs.

Ice sheets, Glacier flow, Glacier oscillation, Glacial meteorology, Basal sliding, Calving, Icebergs, Ice rafting, Global warming, Research projects, Computerized simulation, Greenland

51-2142

Calving study of Austdalsbreen, Norway.

Laumann, T., Workshop on the Calving Rate of West Greenland Glaciers in Response to Climate Change, Copenhagen, Denmark, Sep. 13-15, 1993. Edited by N. Reeh, Copenhagen, Danish Polar Center, 1994, p.57-62, 7 refs.

Glacier surveys, Glacial hydrology, Glacier oscillation, Calving, Glacial lakes, Reservoirs, Water level, Norway

51-2143

Columbia Glacier during rapid retreat: interactions between glacier flow and iceberg calving dynamics.

Meier, M.F., Workshop on the Calving Rate of West Greenland Glaciers in Response to Climate Change, Copenhagen, Denmark, Sep. 13-15, 1993. Edited by N. Reeh, Copenhagen, Danish Polar Center, 1994, p.63-83, 31 refs.

Glacier surveys, Glacier flow, Glacier oscillation, Glacier ablation, Basal sliding, Calving, Icebergs, Computerized simulation, United States—Alaska—Columbia Glacier

51-2144

Calving from Greenland glaciers: observations, balance estimates of calving rates, calving laws.

Reeh, N., Workshop on the Calving Rate of West Greenland Glaciers in Response to Climate Change, Copenhagen, Denmark, Sep. 13-15, 1993. Edited by N. Reeh, Copenhagen, Danish Polar Center, 1994, p.85-102, 15 refs.

Glacier surveys, Glacier oscillation, Glacier mass balance, Glacier ablation, Glacier flow, Glacier friction, Ice shelves, Calving, Computerized simulation, Greenland

51-2145

Sensitivity to climate change of the calf-ice production from Greenland glaciers.

Reeh, N., Workshop on the Calving Rate of West Greenland Glaciers in Response to Climate Change, Copenhagen, Denmark, Sep. 13-15, 1993. Edited by N. Reeh, Copenhagen, Danish Polar Center, 1994, p.103-109, 10 refs.

Glacial meteorology, Glacier oscillation, Glacier ablation, Calving, Icebergs, Global warming, Computerized simulation, Greenland

51-2146

Climatic versus topographic controls on glacier calving.

Warren, C.R., Workshop on the Calving Rate of West Greenland Glaciers in Response to Climate Change, Copenhagen, Denmark, Sep. 13-15, 1993. Edited by N. Reeh, Copenhagen, Danish Polar Center, 1994, p.111-139, 48 refs.

Glacial meteorology, Glacier oscillation, Glacier mass balance, Calving, Icebergs, Topographic effects, Climatic factors, Global warming, Greenland

51-2147

Fluctuations of West Greenland calving glaciers.

Weidick, A., Workshop on the Calving Rate of West Greenland Glaciers in Response to Climate Change, Copenhagen, Denmark, Sep. 13-15, 1993. Edited by N. Reeh, Copenhagen, Danish Polar Center, 1994, p.141-168, 46 refs.

Glacier surveys, Glacier oscillation, Calving, Paleoclimatology, Greenland

51-2148

Summary of discussion.

Fisher, D.A., Workshop on the Calving Rate of West Greenland Glaciers in Response to Climate Change, Copenhagen, Denmark, Sep. 13-15, 1993. Edited by N. Reeh, Copenhagen, Danish Polar Center, 1994, p.169-171.

Glacial meteorology, Glacier flow, Glacier oscillation, Calving, Icebergs, Global warming, Greenland

51-2149

Water chemistry of Rocky Mountain Front Range aquatic ecosystems.

Musselman, R.C., Hudnell, L., Williams, M.W., Sommerfeld, R.A., *U.S. Forest Service. Rocky Mountain Forest and Range Experiment Station. Research paper,* Sep. 1996, RM-RP-325, 13p., 17 refs.

Snow hydrology, Snowmelt, Lake water, Water chemistry, Limnology, Scavenging, Ecosystems, Nutrient cycle, Biomass, United States—Colorado—Front Range

51-2150

Mechanical properties of frozen soils.

Razbegin, V.N., Vialov, S.S., Maksimiak, R.V., Sadovskiĭ, A.V., *Soil mechanics and foundation engineering,* Sep. 1996, 33(2), p.35-45, Translated from Osnovaniia, fundamenty i mekhanika gruntov. 128 refs.

Frozen ground mechanics, Frozen ground strength, Geocryology, Soil tests, Mechanical properties, Phase transformations, Temperature effects, Mechanical tests, Permafrost physics, Loading, Microstructure, Models

51-2151

Effect of temperature on the strength and viscosity of ice.

Zaretskiĭ, IU.K., Fish, A.M., MP 3950, *Soil mechanics and foundation engineering,* Sep. 1996, 33(2), p.46-52, Translated from Osnovaniia, fundamenty i mekhanika gruntov. 13 refs.

Ice physics, Ice strength, Shear strength, Ice mechanics, Viscosity, Temperature effects, Mathematical models, Frozen ground mechanics

51-2152

Some processes defining the rheological behavior of frozen soils under load.

Ukhov, S.B., Vlasov, A.N., Merzliakov, V.P., Savatorova, V.L., Talonov, A.V., *Soil mechanics and foundation engineering,* Sep. 1996, 33(2), p.53-60, Translated from Osnovaniia, fundamenty i mekhanika gruntov. 18 refs.

Frozen ground mechanics, Geocryology, Rheology, Ice water interface, Ice melting, Seepage, Phase transformations, Loading, Thaw weakening, Shear modulus, Compressive properties, Analysis (mathematics)

51-2153

Assessment of reliability of determination of the long-term deformation of frozen saline soils.

Roman, L.T., Brushkov, A.V., Magomedgadzhieva, M.A., *Soil mechanics and foundation engineering,* Sep. 1996, 33(2), p.61-66, Translated from Osnovaniia, fundamenty i mekhanika gruntov. 5 refs.

Frozen ground mechanics, Frozen ground compression, Saline soils, Permafrost bases, Stress concentration, Deformation, Soil creep, Forecasting, Unfrozen water content

51-2154

Determination of perimeter of thaw zone during test prethawing of the beds of buildings and structures.

Mirenburg, IU.S., *Soil mechanics and foundation engineering,* Sep. 1996, 33(2), p.67-71, Translated from Osnovaniia, fundamenty i mekhanika gruntov. 4 refs.

Foundations, Soil strength, Cold weather construction, Frozen ground strength, Frozen ground compression, Ground thawing, Active layer, Settlement (structural), Mechanical tests, Standards, Analysis (mathematics)

51-2155

Local thawing of permafrost beds for foundation installation.

Kolesov, A.A., *Soil mechanics and foundation engineering,* Sep. 1996, 33(2), p.72-74, Translated from Osnovaniia, fundamenty i mekhanika gruntov.

Permafrost beneath structures, Permafrost bases, Frozen ground strength, Ground thawing, Cold weather construction, Pile structures, Settlement (structural), Artificial thawing, Soil tests

51-2156

Installation problems involving foundations of tower head frames on permafrost.

Gur'ianov, I.E., *Soil mechanics and foundation engineering,* Sep. 1996, 33(2), p.75-79, Translated from Osnovaniia, fundamenty i mekhanika gruntov. 21 refs.

Cold weather construction, Towers, Excavation, Mine shafts, Supports, Permafrost bases, Soil stabilization, Permafrost beneath structures, Foundations, Design criteria

51-2157

Method of using permafrost as foundation elements.

Kutvitskaia, N.B., *Soil mechanics and foundation engineering,* Sep. 1996, 33(2), p.80-83, Translated from Osnovaniia, fundamenty i mekhanika gruntov. 4 refs.

Foundations, Cold weather construction, Permafrost bases, Permafrost beneath structures, Bearing strength, Permafrost hydrology, Frozen ground compression, Frozen ground strength

51-2158

Physically based, nondimensional parameter for discriminating between locations of freezing rain and ice pellets.

Czys, R.R., Scott, R.W., Tang, K.C., Przybylinski, R.W., Sabones, M.E., *Weather and forecasting,* Dec. 1996, 11(4), p.591-598, 41 refs.

Precipitation (meteorology), Phase transformations, Cloud physics, Classifications, Sounding, Weather forecasting, Supercooled clouds, Ice storms, Snow pellets, Particle size distribution, Mathematical models, Temperature effects

51-2159

Lightning during two central U.S. winter precipitation events.

Holle, R.L., Watson, A.I., *Weather and forecasting,* Dec. 1996, 11(4), p.599-614, 36 refs.

Precipitation (meteorology), Synoptic meteorology, Fronts (meteorology), Cloud physics, Sounding, Freezing points, Ice detection, Snow pellets, Ice storms, Lightning, Radar echoes, Weather forecasting, Correlation

51-2160

Relationships between seed fates and seedling establishment in an alpine ecosystem.

Chambers, J.C., *Ecology,* Oct. 1995, 76(7), p.2124-2133, 30 refs.

Plant ecology, Ecosystems, Vegetation patterns, Alpine landscapes, Revegetation, Migration, Soil structure, Microstructure, Particle size distribution, Surface roughness, Sampling, Statistical analysis

51-2161

Parametrization of the ice water content observed in frontal and convective clouds.

Bower, K.N., et al, *Royal Meteorological Society. Quarterly journal B,* Oct. 1996, 122(536), p.1815-1844, Refs. p.1842-1844.

Clouds (meteorology), Cloud physics, Air masses, Sounding, Convection, Ice water interface, Ice crystal size, Particle size distribution, Ice breaking, Water content, Liquid phases, Climatic factors

51-2162

Wood Mac: what's needed for Barents Sea development. *Oil & gas journal,* Oct. 21, 1996, 94(43), p.22, 1 ref.

Natural gas, Marine deposits, Exploration, Economic development, Cost analysis, Barents Sea

51-2163

Precipitation, melt and runoff in the northern Tien Shan.

Aizen, V.B., Aizen, E.M., Melack, J.M., *Journal of hydrology,* Nov. 15, 1996, 186(1-4), p.229-251, 36 refs.

Snow hydrology, River basins, Runoff, Snow cover distribution, Snowmelt, Glacier melting, Meltwater, Hydrography, Snow water equivalent, Meteorological factors, Hydrologic cycle, Statistical analysis, Tian Shan

51-2164

Suspended sediment discharge from snowmelt: Ikushunbetsu River, Hokkaido, Japan.

Chikita, K.A., *Journal of hydrology,* Nov. 15, 1996, 186(1-4), p.295-313, 29 refs.

Snow hydrology, Snowmelt, River basins, River flow, Suspended sediments, Grain size, Bedrock, Water erosion, Shear stress, Sediment transport, Sampling, Statistical analysis, Japan—Hokkaido

51-2165

Model for the ice-vapor interface at equilibrium.

Baker, M., Baker, M.B., *Journal of crystal growth,* Nov. 1996, 169(2), p.393-404, 37 refs.

Ice physics, Ice vapor interface, Microstructure, Water films, Adsorption, Thickness, Surface structure, Molecular structure, Temperature effects, Ice models, Mathematical models, Molecular energy levels

51-2166

Feedback-limited photosynthesis and regulation of sucrose-starch accumulation during cold acclimation and low-temperature stress in a spring and winter wheat.

Savitch, L.V., Gray, G.R., Huner, N.P.A., *Planta,* Jan. 1997, 201(1), p.18-26, 28 refs.

Plant physiology, Grasses, Cold stress, Acclimatization, Photosynthesis, Vapor diffusion, Simulation, Cold weather tests, Temperature effects

51-2167

Quaternary glaciations of the Rongbuk Valley, Tibet.

Mann, D.H., Sletten, R.S., Reanier, R.E., *Journal of quaternary science,* July-Aug. 1996, 11(4), p.267-280, Refs. p.279-280.

Pleistocene, Glacial geology, Geomorphology, Paleoecology, Mountain glaciers, Quaternary deposits, Lichens, Moraines, Sampling, Radioactive age determination, Snow line, Statistical analysis, Accuracy, China—Tibet

51-2168

Middle Pleistocene lacustrine deposits in eastern Essex, England and their palaeogeographical implications.

Biggard, P.L., Boreham, S., Roe, H.M., Burger, A.W., *Journal of quaternary science,* July-Aug. 1996, 11(4), p.281-298, Refs. p.296-298.

Pleistocene, Quaternary deposits, Lacustrine deposits, Glacial lakes, River flow, Glacial deposits, Sedimentation, Geomorphology, Lithology, Deltas, United Kingdom—England

51-2169

Glaciotectonic deformation within a flute from the Isfallsglaciären, Sweden.

Eklund, A., Hart, J.K., *Journal of quaternary science,* July-Aug. 1996, 11(4), p.299-310, 27 refs.

Glacial geology, Quaternary deposits, Glacial deposits, Moraines, Glacier beds, Ice solid interface, Striations, Subglacial drainage, Water pressure, Deformation, Tectonics, Lithology, Sweden—Isfallsglaciären

51-2170

Stable oxygen isotope and pollen records from eastern Scotland and a consideration of Late-glacial and early Holocene climate change for Europe.

Whittington, G., Fallick, A.E., Edwards, K.J., *Journal of quaternary science,* July-Aug. 1996, 11(4), p.327-340, Refs. p.338-340.

Paleoclimatology, Climatic changes, Quaternary deposits, Palynology, Sediments, Sampling, Stratigraphy, Isotope analysis, Oxygen isotopes, Correlation, Geochronology, United Kingdom—Scotland

51-2171

Numerical simulations of persistent contrails.

Gierens, K.M., *Journal of the atmospheric sciences,* Nov. 15, 1996, 53(22), p.3333-3348, 38 refs.

Atmospheric physics, Condensation trails, Cloud physics, Ice crystal growth, Supersaturation, Heterogeneous nucleation, Turbulent diffusion, Humidity, Mathematical models, Simulation

51-2172

Epibenthic community patterns on the continental slope off East Greenland.

Mayer, M., Piepenburg, D., *Marine ecology progress series,* Nov. 14, 1996, 243(1-3), p.151-164, Refs. p.163-164.

Marine biology, Ocean bottom, Ecosystems, Distribution, Classifications, Subpolar regions, Sampling, Imaging, Biomass, Statistical analysis, Greenland Sea

51-2173

High resolution of glacial ice stratigraphy: a ground-penetrating radar study of Pegasus Runway, McMurdo Station, Antarctica.

Arcone, S.A., MP 3943, *Geophysics,* Nov.-Dec. 1996, 61(6), p.1653-1663, 31 refs.

Ice runways, Glacier ice, Ice structure, Brines, Water content, Sounding, Radar echoes, Wave propagation, Polarization (waves), Profiles, Ice cover strength, Geophysical surveys, Resolution, Antarctica—McMurdo Station

Ground-penetrating radar has been used to detect areas of present or potential structural weakness beneath a 3.2 km snow-covered ice runway on the Ross Ice Shelf. The data show many horizons up to tens of meters long and occurring to about a 9 m depth, below which a brine intrusion limits penetration. The presence of porous ice or dispersed water is interpreted from wavelet phase. The water may be associated with apparent deepening and fading of the brine horizon. If the above interpretation is correct, water occurs at depths to 3.5 m and extends as much as 40 m horizontally, which is greater and

deeper than known previously. Migration of the diffractions with a single-layer migration scheme shows all horizons above the brine layer to be small dielectric perturbations within the ice. (Auth. mod.)

51-2174

Origin and composition of settling iron aggregates in oligotrophic Sombre Lake, Signy Island, Antarctica.

Caulkett, A.P., Ellis-Evans, J.C., *Hydrobiologia*, Sep. 13, 1996, 330(3), p.177-187, 31 refs.

Limnology, Icebound lakes, Water chemistry, Suspended sediments, Geochemical cycles, Minerals, Metals, Solubility, Sampling, Subglacial observations, Antarctica—Sombre Lake

Sediment traps were deployed in an oligotrophic, seasonally anoxic maritime antarctic lake for 15 months. Immediately after the onset of the inflow in spring iron oxyhydroxide aggregates were collected in the traps. Image analysis, scanning electron microscopy and energy dispersive X-ray analysis were used to examine the aggregates. The aggregates consisted of primary particles that persisted in the aggregates. The concentration of iron, phosphorus and calcium in the aggregates increased with depth, whilst the concentration of manganese decreased with depth in parallel with a gradient of increasing anoxia. The stable water column formed under ice cover and the temporal and spatial data provide evidence that the Fe:P and Fe:Ca ratios are constant and characteristic of the aggregates, whilst the overall composition of the aggregates is more dynamic and dependent on redox conditions and water chemistry. (Auth. mod.)

51-2175

PAR transmittance through thick, clear freshwater ice.

Bolsenga, S.J., Evans, M., Vanderploeg, H.A., Norton, D.G., *Hydrobiologia*, Sep. 13, 1996, 330(3), p.227-230, 20 refs.

Limnology, Lake ice, Ice optics, Transparence, Transmissivity, Radiation measurement, Photometry, Attenuation, Photosynthesis, Ice cover effect, Snow cover effect, Subglacial observations

51-2176

Elemental composition of the aerosol in the atmosphere of the central Russian Arctic.

Vinogradova, A.A., Polissar, A.V., *Izvestiya. Atmospheric and oceanic physics*, Oct. 1995, 31(2), p.248-257, Translated from Izvestiia. Fizika atmosfery i okeana. 18 refs.

Polar atmospheres, Atmospheric composition, Air pollution, Atmospheric circulation, Aerosols, Sampling, Neutron activation analysis, Statistical analysis, Synoptic meteorology, Indexes (ratios), Seasonal variations, Environmental tests, Russia

51-2177

Relationship between the soil-water characteristic curve and the unsaturated shear strength of a compacted glacial till.

Vanapalli, S.K., Fredlund, D.G., Pufahl, D.E., *Geotechnical testing journal*, Sep. 1996, 19(3), p.259-268, 25 refs.

Soil strength, Soil tests, Glacial deposits, Soil structure, Shear strength, Porosity, Saturation, Soil water migration, Simulation, Hydraulics, Atmospheric pressure

51-2178

Continental slope sedimentation adjacent to an ice-margin. II. Glaciomarine depositional facies on Labrador Slope and glacial cycles.

Wang, D., Hesse, R., *Marine geology*, Nov. 1996, 135(1-4), p.65-96, Refs. p.93-96.

Marine geology, Paleoclimatology, Glacial deposits, Marine deposits, Glacier oscillation, Ice edge, Subglacial drainage, Sedimentation, Classifications, Sampling, Lithology, Stratigraphy, Geochronology, Labrador Sea

51-2179

Effects of precipitation and river runoff in a coupled ice-ocean model of the Arctic.

Weatherly, J.W., Walsh, J.E., *Climate dynamics*, Oct. 1996, 12(11), p.785-798, 50 refs.

Climatology, Sea ice distribution, Ice cover thickness, Ice growth, Ocean currents, Heat transfer, River flow, Runoff, Air ice water interaction, Precipitation (meteorology), Ice models, Mathematical models, Arctic Ocean

51-2180

Spatial prediction of climatic state factor regions in Alaska.

Hammond, T., Yarie, J., *Ecoscience*, 1996, 3(4), p.490-501, With French summary. 32 refs.

Climatology, Geography, Subpolar regions, Classifications, Distribution, Meteorological data, Temperature variations, Ecosystems, Growth, Weather observations, Statistical analysis, Forecasting, United States—Alaska

51-2181

Assessments of erosion loss of soils and removal of biogenic substances with surface runoff of melt and rain water in a river basin.

Nazarov, N.A., *Water resources*, Nov.-Dec. 1996, 23(6), p.597-604, Translated from Vodnye resursy. 19 refs.

River basins, Soil erosion, Soil pollution, Hydrology, Water erosion, Environmental impact, Precipitation (meteorology), Surface waters, Mass transfer, Snowmelt, Meltwater, Runoff forecasting, Mathematical models, Geochemistry

51-2182

Ice and thermal regime of the Kamskoe Reservoir in the area of influence of heated water disposal from the Perm' State Regional Power Plant.

Matarzin, IU.M., Kalinin, V.G., *Water resources*, Nov.-Dec. 1996, 23(6), p.630-634, Translated from Vodnye resursy. 13 refs.

Reservoirs, Thermal pollution, Thermal regime, Waste disposal, Ice cover thickness, Ice melting, Ice openings, Water flow, Freezeup, Ice water interface, Water temperature, Heating, Temperature control

51-2183

Late Quaternary geomorphic history of Lower Highland Creek, Wind Cave National Park, South Dakota.

Fredlund, G.G., *Physical geography*, Sep.-Oct. 1996, 17(5), p.446-464, Refs. p.461-464.

Geomorphology, Pleistocene, Landscape development, Quaternary deposits, Alluvium, Soil formation, Sedimentation, Sampling, Soil dating, Geochemistry, United States—South Dakota—Wind Cave National Park

51-2184

Study of surface conductivity and flashover voltage of ice samples formed under various freezing conditions.

Farzaneh, M., Chen, X., Zhang, J., *International journal of offshore and polar engineering*, Dec. 1996, 6(4), p.298-303, 21 refs. For another version see 50-207.

Ice electrical properties, Ice dielectrics, Electrical resistivity, Electrical measurement, Ice accretion, Ice cover effect, Ice solid interface, Ice air interface, Charge transfer, Air temperature, Ice temperature, Simulation

51-2185

Snow and avalanches in the Dolomites and Pre-Alps of the Veneto region, winter 1994/95. [Neve e valanghe nelle Dolomiti e Prealpi Venete, stagione invernale 1994/95]

Cagnati, A., ed, Costantin, N., ed, Pasquali, S., ed, Robert-Luciani, T., ed, Valt, M., ed, Zasso, R., ed, Arabba, Italy, Regione del Veneto, Dipartimento Foreste, Centro Sperimentale Valanghe e Difesa Idrogeologica, [1996], 53p., In Italian with English summary.

Snowfall, Snowstorms, Avalanches, Accidents, Meteorological data, Italy

51-2186

Snow-meteorological yearbook for the Veneto mountains, 1995. [Annale nivometeorologico della montagna Veneta, anno 1995]

Cagnati, A., ed, Arabba, Italy, Regione del Veneto, Dipartimento Foreste, Centro Sperimentale Valanghe e Difesa Idrogeologica, 1996, 345p., In Italian with English summary.

Snow surveys, Snow depth, Snow temperature, Air temperature, Humidity, Wind velocity, Insolation, Albedo, Weather stations, Meteorological data, Italy

51-2187

Binders for surface dressings. Performance after ten year in service on Main Road 119, Skovvejen. [Bindemidler til OB. Resultater efter 10 års brug på hldv. 119, Skovvejen]

Korsgaard, H.C., Nielsen, C.B., *Vejteknisk Institut, Roskilde, Denmark. Eksternt notat*, 1996, No.1, 58p. + appends., In Danish with English summary.

Pavements, Bitumens, Skid resistance, Cold weather performance, Road maintenance, Denmark

51-2188

Ring analysis of Nordic road simulators and proposal for a common test method for determination of the wear resistance of concrete pavements.

Hultqvist, B.Å., Carlsson, B., *Swedish National Road and Transport Research Institute (Statens väg- och transportforskningsinstitut). VTI meddelande*, 1996, No.774A, 43p. + appends., 2 refs. For Swedish version see 50-3847.

Concrete pavements, Concrete durability, Tires, Road maintenance, Abrasion, Environmental tests, Hardness tests

51-2189

Deflection analysis of radially cracked floating ice sheets.

Sodhi, D.S., MP 3944, International Conference on Offshore Mechanics and Arctic Engineering (OMAE), 15th, 1996. Proceedings. Edited by W.A. Nixon, D.S. Sodhi, K.P. Kennedy, H. Yamaguchi, and W. Bugno, New York, American Society of Mechanical Engineers, 1996, p.97-101, 20 refs.

Ice cover strength, Ice loads, Ice pressure, Ice friction, Ice elasticity, Ice deformation, Ice cracks, Crack propagation, Mathematical models

A deflection analysis of radially cracked floating ice sheets by the finite element method is presented. The results of this analysis are used to obtain the elastic energy release rate (or the crack extension force) for radial cracks that form when the maximum stress in an intact ice sheet exceeds the flexural strength of the ice. The elastic energy release rate goes to zero when the radial cracks are about two times the characteristic length of a floating ice sheet. The lengths of the radial cracks obtained from this analysis are in agreement with those observed during full-scale and small-scale experiments.

51-2190

Experience in Sweden of polymer modified waterproofing systems. I. Laboratory testing of polymer modified mastic asphalt. II. The Höga Kusten bridge.

Edwards, Y., *Swedish National Road and Transport Research Institute (Statens väg- och transportforskningsinstitut). VTI särtryck*, 1996, No.263, 18p., 13 refs. Presented at the European Mastic Asphalt Association 29th general meeting, Strasbourg, France, Sep. 26-27, 1996.

Bridges, Pavements, Bitumens, Polymers, Concrete admixtures, Waterproofing, Sweden

51-2191

Historical and current uses of the Northern Sea Route: Part I.

Armstrong, T., *Fridtjof Nansen Institute, Lysaker, Norway. International Northern Sea Route Programme (INSROP). Working paper (IV.1.1)*, Jan. 1996, No.28-1996, 58p., Review of sources and notes, p.55-58.

Route surveys, Expeditions, History, Northern Sea Route

51-2192

Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona.

Gwilliam, B.L., MP 3945, Tempe, Arizona State University, 1990, 66p., M.A. thesis. Refs. p.58-66. Partially supported by the U.S. Army Cold Regions and Research Laboratory.

Snow surveys, Snow air interface, Snow heat flux, Snow hydrology, Snowmelt, Runoff forecasting, Mathematical models, Computerized simulation, United States—Arizona—Mogollon Rim

51-2193

Removal of obscurant cloud particles by falling snow.

Cragin, J.H., Hewitt, A.D., MP 3946, Smoke/Obscurants Symposium, 11th, Laurel, MD, Apr. 21-23, 1987. Proceedings. Vol.3. Unclassified section, Aberdeen Proving Ground, MD, Office of the Project Manager Smoke/Obscurants, 1987, p.619-635, 8 refs.

Falling snow, Snowflakes, Snow optics, Scavenging, Visibility, Smoke generators, Military operation

Experiments conducted within a smoke chamber show that the average scavenging efficiency of several different types of snowflakes and ice crystals for infrared screener EA5763 is approximately 30%. This high efficiency produces rapid obscurant cloud clearing for high mass precipitation rates. Model calculations predict cloud half-lives of 2-20 minutes for snow precipitation rates of 2.5 to 0.5 cm/hr. Scavenging efficiencies are higher for three-dimensional crystals such as spatial dendrites than for planar crystals such as stellars and hexagonal plates. The primary scavenging mechanism for this screener is inertial impaction and it is expected that other obscurants of similar particle size distributions would be scavenged by the same mechanism with comparable efficiency.

51-2194

Smoke-snow synergism.

Farmer, W.M., Gerard, S., Cragin, J.H., MP 3947, Smoke/Obscurants Symposium, 11th, Laurel, MD, Apr. 21-23, 1987. Proceedings. Vol.3. Unclassified section, Aberdeen Proving Ground, MD, Office of the Project Manager Smoke/Obscurants, 1987, p.637-649, 4 refs.

Falling snow, Snowflakes, Snow optics, Scavenging, Visibility, Smoke generators, Military operation

Synergistic effects between smoke and snow can drastically alter how smokes/obscurants performed under winter conditions compared to predictions based on obscurant characteristics under temperate weather conditions. Effects such as snowflake scavenging of smoke/obscurant particles, contrast effects on imaging systems, and disorientation of personnel operating white smoke in a snow background can synergistically work in a snow/cold environment to improve or degrade smoke/obscurant performance. A summary of existing data relative to smoke/snow synergistic effects, an analysis of the parameters that should be measured to evaluate smoke particle scavenging by snow, and the potential operation effects of scavenging are presented. Results of the analysis reveal potentially significant increases in transmittance levels as a result of snow scavenging of smoke particles. Tests being conducted by the Cold Regions Research and Engineering Laboratory to acquire data for evaluating the scavenging capability of snow indicate that because of scavenging effects, significantly higher smoke/obscurant concentrations may be required in snow or cold weather over those normally used for effective warm weather obscuration.

51-2195

Role of ALBE in smoke and obscurants.

Aitken, G.W., Hogan, A.W., Seagraves, M.A., MP 3948, Smoke/Obscurants Symposium, 11th, Laurel, MD, Apr. 21-23, 1987. Proceedings. Vol.3. Unclassified section, Aberdeen Proving Ground, MD, Office of the Project Manager Smoke/Obscurants, 1987, p.737-743.

Environment simulation, Computerized simulation, Topographic surveys, Terrain identification, Weather forecasting, Military operation, Research projects

The U.S. Army Corps of Engineers initiated the AirLand Battlefield Environment (ALBE) program to focus and coordinate Army technology base efforts in the areas of atmospheric, terrestrial and topographic sciences to ensure that the resulting research products are effectively exploited in the research, development and acquisition process and in combat operations. These tech base efforts include many related to smoke and obscurants.

51-2196

Travel to US field stations in Antarctica in preparation for environmental impact studies.

Webb, J.W., Easterly, C.E., *Oak Ridge National Laboratory. Foreign trip report,* Mar. 24, 1993, ORNL/FTR-4552, 14p., DE93 011815.

Logistics, Stations, Maintenance, Waste disposal, Environmental impact, Antarctica—McMurdo Station, Antarctica—Amundsen-Scott Station

The trip covered the period from Jan. 4 through Feb. 22, 1993. The travelers visited Antarctica at the request of the National Science Foundation (NSF) for the purpose of gaining firsthand knowledge of the major environmental issues related to the US antarctic research activities and support operations. The NSF's activities were evaluated under the requirements of the Madrid Protocol that Antarctica be protected for its own intrinsic value and its unique usefulness for future scientific research. The visit was planned to augment and extend investigations undertaken in Oct. and Nov. 1992. Several activities in the vicinity of McMurdo Station and Amundsen-Scott Station were surveyed for possible future environmental impact analyses. (Auth. mod.)

51-2197

Prototype system to support helicopter tracking operations.

Croteau, K., Harris, C., *GIS world,* Aug. 1996, 9(8), p.42-45, 2 refs.

Helicopters, Aircraft landing areas, Logistics, Antarctica—McMurdo Station

Tracking a helicopter fleet, passengers, and cargo in a potentially hazardous antarctic environment can be a challenge. Researchers at the International Centre for Antarctic Information and Research, Christchurch, New Zealand, developed the Helicopter Operations Tracking System (HOTS), a prototype information system to manage, query and display data related to helicopter operations at Antarctica's largest center of helicopter operations: the U.S. Antarctic Program at McMurdo Station. HOTS links GIS (Geographic Information Systems) to a relational database to analyze operational data and produce informative graphs, tables and maps in and for the McMurdo/Scott Base, Dry Valleys, Mount Erebus, and near Victoria Land region.

51-2198

Risk-equivalent seasonal discharge programs for ice-covered rivers. Discussion.

Ferrick, M.G., Calkins, D.J., MP 3949, *Journal of water resources planning and management,* Nov.-Dec. 1996, 122(6), p.442-444, 3 refs. For pertinent paper see 49-5730.

River flow, Flow control, Water chemistry, Oxygen, Aeration, River ice, Ice water interface, Ice cover effect, Seasonal variations, Statistical analysis, Models, Accuracy

Models of dissolved oxygen (DO) in rivers covered by ice are not yet well established in the literature. The authors modeled the DO response of a 92 km reach of the St. John River using Streeter-Phelps (1958). Based on the results of this model, they concluded that the summer season for this river always had more critical DO conditions than the ice-covered season. However, the authors used minimal data to calibrate their model, simulated a very short river reach in which a DO minimum may not occur, and did not present any data for verification of model results and support of conclusions derived from it. Four primary issues are addressed in this discussion: (1) the assumptions and limitations of the Streeter-Phelps model; (2) existing ice-covered river data for model evaluation; (3) the appropriate hydraulic representation for ice-covered rivers; and (4) available data for the study reach of the St. John River.

51-2199

Seasonal cycle of phytoplankton, macronutrients, and the microbial community in a nearshore antarctic marine ecosystem.

Clarke, A., Leakey, R.J.G., *Limnology and oceanography,* Sep. 1996, 41(6), p.1281-1294, Refs. p.1292-1294.

Marine biology, Fast ice, Plankton, Ecosystems, Biomass, Nutrient cycle, Chlorophylls, Water chemistry, Sampling, Hydrography, Water temperature, Seasonal variations, Subglacial observations, Antarctica—Signy Island

Seawater chlorophyll *a* concentration and temperature have been measured weekly from Dec. 1988 to Aug. 1994 at a nearshore shallow-water station at Signy I. in the maritime Antarctic. Macronutrients were measured monthly, and the microbial community was enumerated during a 15-month period. The duration of winter sea-ice, summer seawater temperature, and peak chlorophyll biomass all exhibited strong interannual variability. Seasonal macronutrient patterns suggested a preferential utilization of ammonium at the start of spring followed by a major utilization of nitrate by the summer diatom bloom. The microbial community was complex and showed a clear seasonality in all components, although the timing of the summer bloom differed between taxa. This study emphasizes the complex nature of the nearshore marine ecosystem and highlights the need for year-round oceanographic studies in the highly seasonal polar marine environment. (Auth. mod.)

51-2200

Determining the impact-failure parameters of frozen soil.

Fedulov, A.I., Ivanov, R.A., *Journal of mining science,* Nov. 1996, 32(4), p.301-304, Translated from Fiziko-tekhnicheskie problemy razrabotki poleznykh iskopaemykh.

Excavation, Mining, Hammers, Penetration tests, Impact tests, Impact strength, Pile driving, Frozen ground strength, Mechanical tests, Design

51-2201

Mesoscale and microscale structures of snow clouds over the Sea of Japan. Part 3: two types of circulations in snow bands associated with a wind-speed-increase zone preceding cold-air outbreaks.

Yamada, Y., Murakami, M., Mizuno, H., Matsuo, T., Fujiyoshi, Y., Iwanami, K., *Meteorological Society of Japan. Journal,* Oct. 1996, 74(5), p.593-615, With Japanese summary. 16 refs.

Synoptic meteorology, Marine meteorology, Cloud physics, Mass transfer, Snowfall, Atmospheric boundary layer, Radio echo soundings, Stratification, Air flow, Wind velocity, Shear flow, Japan, Sea

51-2202

Influence of topography on snowpatch distribution in southern Iceland: a new hypothesis for glacier formation?

Brown, I., Ward, R., *Geografiska annaler,* 1996, 78A(4), p.197-207, 29 refs.

Glacier formation, Glacier oscillation, Snow accumulation, Nivation, Nival relief, Snow cover distribution, Cirques, Topographic effects, Spaceborne photography, Sensor mapping, Infrared photography, Iceland

51-2203

Moraine development at the high-arctic valley glacier Pedersenbreen, Svalbard.

Bennett, M.R., Huddart, D., Hambrey, M.J., Ghienne, J.F., *Geografiska annaler,* 1996, 78A(4), p.209-222, Refs. p.221-222.

Glacial geology, Pleistocene, Arctic landscapes, Geomorphology, Moraines, Glacier surges, Ice push, Glacial deposits, Sediment transport, Soil profiles, Hummocks, Norway—Svalbard

51-2204

Early post glacial-history of Lake Sirkkajärvi, southern Finland, with implications to the "g stage" of the Baltic.

Korhola, A., Tikkanen, M., *Geografiska annaler,* 1996, 78A(4), p.235-245, Refs. p.243-245.

Limnology, Quaternary deposits, Glacial lakes, Water level, Meltwater, Shoreline modification, Sedimentation, Lacustrine deposits, Radioactive age determination, Water level, Paleoecology, Stratigraphy, Finland—Sirkkajärvi, Lake

51-2205

Example of supercooled drizzle drops formed through a collision-coalescence process.

Cober, S.G., Strapp, J.W., Isaac, G.A., *Journal of applied meteorology,* Dec. 1996, 35(12), p.2251-2260, 33 refs.

Cloud physics, Ice formation, Aerial surveys, Probes, Particles, Sampling, Supercooled clouds, Cloud droplets, Microstructure, Coalescence, Condensation, Drops (liquids), Aircraft icing, Ice water interface

51-2206

New formulation for the critical temperature for contrail formation.

Coleman, R.F., *Journal of applied meteorology,* Dec. 1996, 35(12), p.2270-2282, 16 refs.

Cloud physics, Atmospheric composition, Condensation trails, Jet engines, Ice formation, Air temperature, Turbulent diffusion, Atmospheric pressure, Temperature effects, Mathematical models, Forecasting

51-2207

Principal components analysis of arctic ice conditions between 1978 and 1987 as observed from the SMMR data record.

Piwowar, J.M., LeDrew, E.F., *Canadian journal of remote sensing,* Dec. 1996, 22(4), p.390-403, With French summary. 33 refs.

Sea ice distribution, Ice conditions, Seasonal variations, Ice surveys, Remote sensing, Spaceborne photography, Radiometry, Image processing, Data processing, Resolution, Arctic Ocean

51-2208

Comparison of evidential reasoning and neural network approaches in a multi-source classification of alpine tundra vegetation.

Duguay, C.R., Peddle, D.R., *Canadian journal of remote sensing,* Dec. 1996, 22(4), p.433-440, With French summary. 25 refs.

Remote sensing, Spaceborne photography, Radiometry, Topographic surveys, Alpine landscapes, Tundra terrain, Tundra vegetation, Landscape types, Vegetation patterns, Classifications, Image processing, Resolution, Accuracy, Computer programs

51-2209

Optical constants of liquid and solid methane.

Martonchik, J.V., Orton, G.S., *Applied optics,* Dec. 20, 1994, 33(36), p.8306-8317, 23 refs.

Frozen liquids, Hydrocarbons, Natural gas, Optical properties, Radiation absorption, Spectra, Brightness, Infrared spectroscopy, Extraterrestrial ice, Simulation, Standards

51-2210

Geometric-optics-integral-equation method for light scattering by nonspherical ice crystals.

Yang, P., Liou, K.N., *Applied optics,* Nov. 20, 1996, 35(33), p.6568-6584, 25 refs.

Ice crystal optics, Cloud physics, Light scattering, Wave propagation, Ice crystal structure, Ice crystal size, Mathematical models, Radiation absorption, Polarization (waves), Electromagnetic properties, Theories

51-2211

Nitrogen mineralization, plant growth and goose herbivory in an arctic coastal ecosystem.

Wilson, D.J., Jefferies, R.L., *Journal of ecology,* Dec. 1996, 84(6), p.841-851, 49 refs.

Arctic landscapes, Ecosystems, Soil chemistry, Minerals, Geochemical cycles, Wetlands, Plant ecology, Vegetation patterns, Plant tissues, Chemical analysis, Nutrient cycle, Biomass, Sampling

51-2212

Growth response of graminoid plants to goose grazing in a High Arctic environment.

Beaulieu, J., Gauthier, G., Rochefort, L., *Journal of ecology,* Dec. 1996, 84(6), p.905-914, 45 refs.

Plant ecology, Arctic landscapes, Ecosystems, Grasses, Nutrient cycle, Biomass, Plant tissues, Damage, Growth, Sampling, Environmental impact, Survival, Statistical analysis

51-2213

Multiple scattering from clear atmosphere obscured by transparent crystal clouds in satellite-borne lidar sensing.

Flesia, C., Starkov, A.V., *Applied optics,* May 20, 1996, 35(15), p.2637-2641, 10 refs.

Cloud physics, Optical properties, Transparence, Radiation balance, Ice crystal optics, Light scattering, Wave propagation, Anisotropy, Lidar, Sounding, Statistical analysis

51-2214

Evaluation of protective coatings for the *in situ* preservation of historic timber buildings in a harsh antarctic environment.

Hughes, J., Materials issues in art and archeology III. Vol.267. Symposium held Apr. 27-May 1, 1992, San Fransico, CA, USA. Edited by P.B. Vandiver, J.R. Druzik, G.S. Wheeler, and I.C. Freestone, Pittsburgh, PA, Materials Research Society, 1992, p.981-988, 10 refs.

DLC CC135.M34 3rd 1992

Buildings, Wooden structures, Low temperature tests, Damage, Wind factors, Antarctica—Commonwealth Bay, Antarctica—Denison, Cape

The Australasian Antarctic Expedition base at Commonwealth Bay, also known as 'Mawson's Huts' include some of the earliest buildings in Antarctica. The prefabricated timber buildings of Oregon beams and Baltic Pine *(Pinus sylvestris)* claddings were erected in Jan. 1912 and were occupied for two years: they are thus approximately contemporary with the better known Scott and Shackleton huts near McMurdo Base in the Ross Sea. While the huts are of recent date, the rapid rate of deterioration due to the extreme climate means there is some urgency to developing a method of preserving the building. The timbers have been seriously corroded by snow particles carried in the katabatic winds which can exceed 300 km/hour, sometimes for days. The isolation of the site, accessible by sea for only three months of the year adds to the logistical difficulties. There has been considerable public debate in Australia about which method of preservation is appropriate. (Auth. mod.)

51-2215

[Proceedings].

Symposium on Air Infiltration, Ventilation and Moisture Transfer, Fort Worth, TX, Dec. 2-4, 1986, Washington, D.C., National Institute of Building Sciences, Building Thermal Envelope Coordinating Council (BTECC), 1988, 483p., Refs. passim. For selected papers see 41-4575 and 51-2216 through 51-2229.

Houses, Indoor climates, Climate control, Humidity, Moisture transfer, Ventilation, Vapor barriers, Thermal insulation, Weatherproofing

51-2216

Mathematical model for indoor humidity in homes during winter.

TenWolde, A., Symposium on Air Infiltration, Ventilation and Moisture Transfer, Fort Worth, TX, Dec. 2-4, 1986, Washington, D.C., National Institute of Building Sciences, Building Thermal Envelope Coordinating Council (BTECC), 1988, p.3-32, 9 refs.

Houses, Residential buildings, Indoor climates, Climate control, Humidity, Dehumidification, Ventilation, Moisture transfer, Mathematical models

51-2217

Moisture management in buildings.

Achenbach, P.R., Symposium on Air Infiltration, Ventilation and Moisture Transfer, Fort Worth, TX, Dec. 2-4, 1986, Washington, D.C., National Institute of Building Sciences, Building Thermal Envelope Coordinating Council (BTECC), 1988, p.73-81, 31 refs.

Buildings, Indoor climates, Climate control, Ventilation, Humidity, Dehumidification, Moisture transfer

51-2218

Wet walls: apparent incidence of excessive condensation in house envelope construction in Canada.

Platts, R.E., Symposium on Air Infiltration, Ventilation and Moisture Transfer, Fort Worth, TX, Dec. 2-4, 1986, Washington, D.C., National Institute of Building Sciences, Building Thermal Envelope Coordinating Council (BTECC), 1988, p.82-90, 5 refs.

Houses, Walls, Moisture detection, Weatherproofing, Vapor barriers, Thermal insulation, Canada

51-2219

Effect of an improved window on condensation potential.

Jones, W.R., Symposium on Air Infiltration, Ventilation and Moisture Transfer, Fort Worth, TX, Dec. 2-4, 1986, Washington, D.C., National Institute of Building Sciences, Building Thermal Envelope Coordinating Council (BTECC), 1988, p.98-110, 6 refs.

Houses, Windows, Indoor climates, Climate control, Weatherproofing, Humidity, Moisture transfer, Protective coatings

51-2220

Construction details affecting wall condensation.

Kudder, R.J., Lies, K.M., Hoigard, K.R., Symposium on Air Infiltration, Ventilation and Moisture Transfer, Fort Worth, TX, Dec. 2-4, 1986, Washington, D.C., National Institute of Building Sciences, Building Thermal Envelope Coordinating Council (BTECC), 1988, p.131-140.

Buildings, Walls, Indoor climates, Climate control, Weatherproofing, Humidity, Moisture transfer, Vapor barriers

51-2221

Improved performance standards for polyethylene sheet vapour barriers.

Houston, A.J., Symposium on Air Infiltration, Ventilation and Moisture Transfer, Fort Worth, TX, Dec. 2-4, 1986, Washington, D.C., National Institute of Building Sciences, Building Thermal Envelope Coordinating Council (BTECC), 1988, p.141-150, 6 refs.

Houses, Walls, Vapor barriers, Building codes, Standards, Canada

51-2222

Residential combustion venting failures—a systems approach.

Swinton, M.C., Moffatt, S., White, J.H., Symposium on Air Infiltration, Ventilation and Moisture Transfer, Fort Worth, TX, Dec. 2-4, 1986, Washington, D.C., National Institute of Building Sciences, Building Thermal Envelope Coordinating Council (BTECC), 1988, p.260-272, 9 refs.

Houses, Ventilation, Air pollution, Indoor climates, Climate control, Ducts, Canada

51-2223

Effect of installation defects on the thermal performance of mineral fiber insulation.

Clausen, I.L., Hoyer, H., Symposium on Air Infiltration, Ventilation and Moisture Transfer, Fort Worth, TX, Dec. 2-4, 1986, Washington, D.C., National Institute of Building Sciences, Building Thermal Envelope Coordinating Council (BTECC), 1988, p.292-294, 3 refs.

Buildings, Roofs, Thermal insulation, Heat loss

51-2224

Review of standards and product certification programs for heat recovery ventilators.

Wellford, B.W., Symposium on Air Infiltration, Ventilation and Moisture Transfer, Fort Worth, TX, Dec. 2-4, 1986, Washington, D.C., National Institute of Building Sciences, Building Thermal Envelope Coordinating Council (BTECC), 1988, p.307-320, 52 refs.

Houses, Indoor climates, Climate control, Ventilation, Heat recovery, Standards

51-2225

Developing guidelines for avoiding moisture problems in energy retrofits.

Platts, R.E., Symposium on Air Infiltration, Ventilation and Moisture Transfer, Fort Worth, TX, Dec. 2-4, 1986, Washington, D.C., National Institute of Building Sciences, Building Thermal Envelope Coordinating Council (BTECC), 1988, p.331-338, 3 refs.

Houses, Indoor climates, Climate control, Humidity, Moisture transfer, Ventilation, Thermal insulation, Vapor barriers, Weatherproofing, Canada

51-2226

Moisture transfer characteristics of heat recovery ventilation systems employing rotary heat wheels—winter and summer conditions.

Hoagland, L.C., Symposium on Air Infiltration, Ventilation and Moisture Transfer, Fort Worth, TX, Dec. 2-4, 1986, Washington, D.C., National Institute of Building Sciences, Building Thermal Envelope Coordinating Council (BTECC), 1988, p.346-360, 13 refs.

Houses, Indoor climates, Climate control, Ventilation, Heat recovery, Humidity, Dehumidification, Moisture transfer

51-2227

Heat pump approach to exhaust air heat recovery.

Haysom, J.C., Dewil, J.M., Symposium on Air Infiltration, Ventilation and Moisture Transfer, Fort Worth, TX, Dec. 2-4, 1986, Washington, D.C., National Institute of Building Sciences, Building Thermal Envelope Coordinating Council (BTECC), 1988, p.361-381, 5 refs.

Houses, Ventilation, Heat pumps, Heat recovery, Canada

51-2228

Design, construction and performance of a dynamic wall house.

Timusk, J., Symposium on Air Infiltration, Ventilation and Moisture Transfer, Fort Worth, TX, Dec. 2-4, 1986, Washington, D.C., National Institute of Building Sciences, Building Thermal Envelope Coordinating Council (BTECC), 1988, p.382-396, 6 refs.

Houses, Walls, Indoor climates, Climate control, Ventilation, Thermal insulation, Vapor barriers

51-2229

Study of air infiltration and natural ventilation in dwelling houses.

Nantka, M.B., Symposium on Air Infiltration, Ventilation and Moisture Transfer, Fort Worth, TX, Dec. 2-4, 1986, Washington, D.C., National Institute of Building Sciences, Building Thermal Envelope Coordinating Council (BTECC), 1988, p.443-455, 10 refs.

Residential buildings, Houses, Indoor climates, Climate control, Ventilation, Air leakage, Poland

51-2230

Photochemistry of chlorine dioxide in polycrystalline ice (T=140—185 K): production of chloryl chloride, Cl—(OClO).

Pursell, C.J., Conyers, J., Denison, C., *Journal of physical chemistry,* Sep. 19, 1996, 100(38), p.15450-15453, 17 refs.

Polar atmospheres, Polar stratospheric clouds, Aerosols, Stratosphere, Cloud physics, Ice vapor interface, Ice formation, Ice spectroscopy, Photochemical reactions, Heterogeneous nucleation, Simulation, Temperature effects, Phase transformations

In a simulation pertinent to antarctic ozone depletion the photochemistry of chlorine dioxide, OClO, in polycrystalline ice has been investigated at T=140-185 K using FTIR and UV-vis spectroscopy. Photolysis with ultraviolet light at 360 nm produced chloryl chloride, Cl-(OClO). The proposed mechanism for the formation of Cl-(OClO) involves photolysis of OClO to $Cl+O_2$ followed by migration of the Cl to a nonphotolyzed OClO. While clustering of the OClO may play a role in the formation of the product, experimental evidence indicates that the OClO prefers to exist as a monomer solvated by the water. These results have potential implications for stratospheric ozone loss: under the very dilute conditions that would exist on polar stratospheric ice particles, the photochemical conversion of OClO to $Cl+O_2$ would represent a new source of Cl atoms for ozone depletion. (Auth. mod.)

51-2231

Numerical analysis of solid-liquid phase change heat transfer around a single and two horizontal, vertically spaced cylinders in a rectangular cavity.

Sasaguchi, K., Kusano, K., Viskanta, R., *International journal of heat and mass transfer,* Apr. 1997, 40(6), p.1343-1354, 19 refs.

Phase transformations, Liquid solid interfaces, Heat transfer, Ice formation, Solidification, Freezing rate, Ice water interface, Mathematical models, Temperature effects, Temperature gradients, Statistical analysis

51-2232

History of forest damage in Monchegorsk, Kola; retrospective analysis based on tree rings.

Nöjd, P., Mikkola, K., Saranpää, P., *Canadian journal of forest research,* Oct. 1996, 26(10), p.1805-1812, With French summary. 41 refs.

Forest ecosystems, Subpolar regions, Plant ecology, Damage, Growth, Air pollution, Subpolar regions, Mining, Aerosols, Environmental impact, Sampling, Age determination, Wind factors, Russia—Monchegorsk

51-2233

Genetics of fall and winter cold hardiness of coastal Douglas-fir in Oregon.

Aitken, S.N., Adams, W.T., *Canadian journal of forest research,* Oct. 1996, 26(10), p.1828-1837, With French summary. 26 refs.

Trees (plants), Cold tolerance, Plant ecology, Plant tissues, Acclimatization, Seasonal variations, Cold weather tests, Freezing, Damage, Phenology, Statistical analysis

51-2234

Synoptic climatology of lightning-caused forest fires in subalpine and boreal forests.

Nash, C.H., Johnson, E.A., *Canadian journal of forest research,* Oct. 1996, 26(10), p.1859-1874, With French summary. Refs. p.1873-1874.

Atmospheric disturbances, Lightning, Forest fires, Alpine landscapes, Forest ecosystems, Damage, Moisture, Atmospheric pressure, Climatic factors, Synoptic meteorology, Seasonal variations, Correlation, Weather observations

51-2235

Bioclastic carbonate sediments on the southwestern Svalbard shelf.

Andruleit, H., Freiwald, A., Schäfer, P., *Marine geology,* Oct. 1996, 134(3-4), p.163-182, Refs. p.180-182.

Oceanographic surveys, Paleoecology, Ocean currents, Marine geology, Ice shelves, Glacial deposits, Sediments, Sediment transport, Ecosystems, Sampling, Geochemical cycles, Lithology, Norway—Svalbard

51-2236

Productivity cycles of 200-300 years in the Antarctic Peninsula region: understanding linkages among the sun, atmosphere, oceans, sea ice, and biota.

Leventer, A., Domack, E.W., Ishman, S.E., Brachfeld, S., McClennen, C.E., Manley, P., *Geological Society of America. Bulletin,* Dec. 1996, 108(12), p.1626-1644, Refs. p.1642-1644.

Paleoclimatology, Paleoecology, Marine biology, Sedimentation, Biomass, Climatic changes, Periodic variations, Drill core analysis, Geochronology, Correlation, Antarctica—Antarctic Peninsula

The authors present a multiproxy record from a sediment core retrieved from a deep basin on the western side of the Antarctic Peninsula that reveals a dramatic perspective on paleoclimatic changes over the past 3700 yr. Analyses completed include measurement of magnetic susceptibility and granulometry, bed thickness, particle size, percent organic carbon, bulk density, and microscopic evaluation of diatom and benthic foraminiferal assemblages and abundances. Downcore variability of these parameters demonstrates the significance of both short-term cycles, which recur approximately every 200 yr, and longer term events (approx. 2500 yr cycles) that are most likely related to global climatic fluctuations. Overall elevated productivity is noted below 600 cm, or prior to ca. 2500 yr B.P. This increased productivity may represent the tail end of a Holocene climatic optimum, which is widely recognized in other parts of the world, but as yet is poorly documented in Antarctica. (Auth. mod.)

51-2237

Freezing dehydration damages roots of containerized Scots pine (*Pinus sylvestris*) seedlings overwintering under subarctic conditions.

Sutinen, M.L., Mäkitalo, K., Sutinen, R., *Canadian journal of forest research,* Sep. 1996, 26(9), p.1602-1609, With French summary. 28 refs.

Forestry, Trees (plants), Storage, Desiccation, Plant tissues, Roots, Frost resistance, Cold stress, Damage, Snow cover effect, Cold weather survival, Cold weather tests, Simulation

51-2238

Cold responses of *Arabidopsis* mutants impaired in freezing tolerance.

McKown, R., Kuroki, G., Warren, G., *Journal of experimental botany,* Dec. 1996, 47(305), p.1919-1925, 29 refs.

Plants (botany), Cold tolerance, Frost resistance, Acclimatization, Plant physiology, Plant tissues, Chemical analysis, Classifications, Correlation, Statistical analysis

51-2239

Primary dendrite spacing in land-fast polar sea ice.

Sinha, N.K., Zhan, C., *Journal of materials science letters,* Dec. 15, 1996, 15(24), p.2118-2121, 18 refs.

Sea ice, Fast ice, Ice microstructure, Dendritic ice, Ice cores, Thin sections, Ice growth, Salinity, Solubility, Brines, Ice water interface, Porosity, Gas inclusions

51-2240

In-place temperature recording for the Carl A. Kroch Library project.

Johnson, G.L., Farrell, C.W., Hover, K.C., *Concrete international,* Nov. 1996, 18(11), p.51-57, 4 refs.

Winter concreting, Buildings, Concrete placing, Concrete slabs, Temperature measurement, Temperature variations, Temperature control, Covering, Sensors, Thermocouples

51-2241

New technique for growing crystals from the vapor.

Nelson, J., Knight, C.A., *Journal of crystal growth,* Dec. 1996, 169(4), p.795-797, 8 refs.

Ice crystal growth, Ice physics, Laboratory techniques, Ice vapor interface, Vapor pressure, Supersaturation

51-2242

Cover—SAR interferogram of Bagley Ice Field.

Fatland, D.R., *International journal of remote sensing,* Jan. 10, 1997, 18(1), p.3-4.

Ice sheets, Glacier ice, Surface properties, Flow measurement, Remote sensing, Spaceborne photography, Synthetic aperture radar, Image processing, Backscattering, Polarization (waves), United States—Alaska—Bagley Ice Field

51-2243

Photogrammetric analysis for early recognition of glacier- and permafrost-associated natural hazards in high mountains. [Photogrammetrische Analyse zur Früherkennung gletscher- und permafrostbedingter Naturgefahren im Hochgebirge]

Kääb, A., *Zürich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen,* 1996, No.145, 182p., In German with English summary. Refs. p.173-181.

Glacier surveys, Glacier flow, Glacial hydrology, Permafrost surveys, Permafrost distribution, Permafrost hydrology, Periglacial processes, Slope stability, Lake bursts, Mudflows, Avalanche forecasting, Flood forecasting, Photogrammetry

51-2244

Flushing of the Margaritze Reservoir. [Spülung des Speichers Margaritze]

Wagner, E.K., Karlsböck, N., Niedermühlbichler, H., *Zürich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen,* 1996, No.142, Internationales Symposium: Verlandung von Stauseen und Stauhaltungen, Sedimentprobleme in Leitungen und Kanälen (International Symposium on the Silting Up of Reservoirs and Headwaters, and the Sediment Problem in Conduits and Canals), Zürich, Switzerland, Mar. 28-29, 1996. Part 1, p.123-136, In German with English summary. 3 refs.

Glacial rivers, Reservoirs, Dams, Outwash, Alluvium, Suspended sediments, Bottom sediment, River flow, Flow control, Austria

51-2245

Sedimentation in the Gebidem hydroelectric reservoir and some of its consequences. [Ablagerungen im Stausee Gebidem und einige ihrer Folgen]

Rechsteiner, G., *Zürich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen,* 1996, No.142, Internationales Symposium: Verlandung von Stauseen und Stauhaltungen, Sedimentprobleme in Leitungen und Kanälen (International Symposium on the Silting Up of Reservoirs and Headwaters, and the Sediment Problem in Conduits and Canals), Zürich, Switzerland, Mar. 28-29, 1996. Part 1, p.137-148, In German with English summary. 2 refs.

Glacial lakes, Reservoirs, Dams, Outwash, Alluvium, Suspended sediments, Bottom sediment, Sediment transport, River flow, Flow control, Switzerland

51-2246

Input and output of sediments in the flushing channel of Gebidem—model tests and numerical simulation. [Eintrag und Austrag von Feststoffen im Spülkanal von Gebidem—Modellversuche und numerische Simulation]

Boillat, J.L., Dubois, J., Lazaro, P., *Zürich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen,* 1996, No.142, Internationales Symposium: Verlandung von Stauseen und Stauhaltungen, Sedimentprobleme in Leitungen und Kanälen (International Symposium on the Silting Up of Reservoirs and Headwaters, and the Sediment Problem in Conduits and Canals), Zürich, Switzerland, Mar. 28-29, 1996. Part 1, p.151-170, In German with English summary. 7 refs.

Glacial rivers, Suspended sediments, Alluvium, Bottom sediment, Sediment transport, Water erosion, River flow, Flow control, Channel stabilization, Mathematical models, Switzerland

51-2247

Flushing of the Ova Spin reservoir. [Spülung des Stausees Ova Spin]

Hälg, R., *Zürich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen,* 1996, No.142, Internationales Symposium: Verlandung von Stauseen und Stauhaltungen, Sedimentprobleme in Leitungen und Kanälen (International Symposium on the Silting Up of Reservoirs and Headwaters, and the Sediment Problem in Conduits and Canals), Zürich, Switzerland, Mar. 28-29, 1996. Part 1, p.171-187, In German with English summary.

Snowmelt, Reservoirs, Dams, Suspended sediments, Alluvium, Bottom sediment, Sediment transport, River flow, Flow control, Flood control, Irrigation, Switzerland

51-2248

Restoration of Palü compensation basin. [Sanierung des Staubeckens Palü]

Kanne, S., Baumann, R., *Zürich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen,* 1996, No.142, Internationales Symposium: Verlandung von Stauseen und Stauhaltungen, Sedimentprobleme in Leitungen und Kanälen (International Symposium on the Silting Up of Reservoirs and Headwaters, and the Sediment Problem in Conduits and Canals), Zürich, Switzerland, Mar. 28-29, 1996. Part 1, p.205-222, In German with English and French summaries.

Glacial rivers, Reservoirs, Moraines, Glacial till, Bottom sediment, Sediment transport, Dredging, Flow control, Switzerland

51-2249

Measurement and simulation of high alpine water balance components in the Linth-Limmern head watershed (north-eastern Switzerland).

Braun, L.N., et al, *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1994(Pub. 1995), Vol.30, p.161-185, 55 refs.

Watersheds, River basins, Water balance, Precipitation (meteorology), Snow accumulation, Snow hydrology, Snowmelt, Glacier mass balance, Glacial hydrology, Meltwater, Runoff forecasting, Switzerland

51-2250

Long-term mass balance series of Swiss glaciers. [Langjährige Massenbilanzreihen von Gletschern in der Schweiz]

Müller-Lemans, H., Funk, M., Aellen, M., Kappenberger, G., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1994(Pub. 1995), Vol.30, p.141-160, In German with English summary. 24 refs.

Glacier surveys, Glacier oscillation, Glacier mass balance, Statistical analysis, Switzerland

51-2251

Forecasting soil moisture phase composition in a frozen peat soil.

Gamaiunov, N.I., Stotland, D.M., *Eurasian soil science,* Dec. 1996, 28(12), p.131-145, Translated from Pochvovedenie. 26 refs.

Frozen ground thermodynamics, Peat, Soil freezing, Soil water, Hygroscopic water, Ice sublimation, Ice water interface, Unfrozen water content, Phase transformations, Forecasting, Mathematical models

51-2252

Microflora of tundra soils in the Kola Peninsula.

Evdokimova, G.A., Mozgova, N.P., *Eurasian soil science,* Dec. 1996, 28(12), p.188-203, Translated from Pochvovedenie. 20 refs.

Subpolar regions, Tundra soils, Tundra vegetation, Podsol, Soil microbiology, Sampling, Soil analysis, Biomass, Classifications, Ecosystems, Statistical analysis, Russia—Kola Peninsula

51-2253

Basic features of the geochemistry of arctic soil formation.

Dobrovol'skiĭ, V.V., *Eurasian soil science,* Dec. 1996, 28(12), p.218-230, Translated from Pochvovedenie. 32 refs.

Soil formation, Cryogenic soils, Substrates, Bedrock, Frozen ground chemistry, Geochemistry, Chemical composition, Mass transfer, Metals, Aerosols, Ion density (concentration)

51-2254

Patterns of tree stem decline along a snow-drift gradient at treeline: a case study using stem analysis.

Payette, S., Delwaide, A., Morneau, C., Lavoie, C., *Canadian journal of botany,* Nov. 1996, 74(11), p.1671-1683, With French summary. 42 refs.

Forest ecosystems, Subarctic landscapes, Forest lines, Snow line, Plant tissues, Degradation, Chemical analysis, Snow cover effect, Snowdrifts, Blowing snow, Abrasion, Wind factors, Wind chill, Growth, Seasonal variations, Statistical analysis

51-2255

Grasses of the Canadian Arctic Archipelago: a DELTA data base for interactive identification and illustrated information retrieval.

Aiken, D.G., Consaul, L.L., Dallwitz, M.J., *Canadian journal of botany,* Nov. 1996, 74(11), p.1812-1825, With French summary. 54 refs.

Plants (botany), Grasses, Arctic landscapes, Classifications, Statistical analysis, Vegetation patterns, Computer programs, Computer applications, Canada—Northwest Territories—Arctic Archipelago

51-2256

Some effects of lateral heterogeneities in the upper mantle on postglacial land uplift close to continental margins.

Kaufmann, G., Wu, P., Wolf, D., *Geophysical journal international,* Jan. 1997, 128(1), p.175-187, 37 refs.

Earth crust, Thickness, Tectonics, Isostasy, Ice loads, Glacial geology, Sea level, Pleistocene, Models, Simulation

51-2257

Excitation of the 5-day wave by Antarctica.

Cheong, H.B., Kimura, R., *Journal of the atmospheric sciences,* Jan. 1, 1997, 54(1), p.87-102, 28 refs.

Atmospheric circulation, Atmospheric pressure, Climatology, Stratosphere, Weather forecasting, Wave propagation, Periodic variations, Statistical analysis, Mathematical models

The 5-day wave has been detected in composite maps of geopotential height fields of European Centre for Medium-Range Weather Forecasts dataset for 7 years (1984-91, except 1985) and shows a characteristic northwest-southeast meridional phase tilt in the Southern Hemisphere. A numerical integration of Laplace's tidal equations with periodic forcing of zonal wavenumber 1 only produced the meridional phase tilt where the forcing is located in high latitudes. Such a forcing is created through coupling of the time-fluctuating westerlies with the topography of Antarctica. Numerical simulations that incorporated this mechanism reproduced the observed meriodional phase tilt of the 5-day wave, which suggests that Antarctica is responsible for the observed phase tilt through the process of resonance. A linear theory on the meridional phase tilt is given with a nondivergent barotropic model that includes both forcing and dissipation. (Auth.)

51-2258

Influence of exchange of air masses on aerosol extinction at the measurement point under winter conditions.

Uzhegov, V.N., Belan, B.D., Pkhalagov, IU.A., Shchelkanov, N.N., *SPIE—The International Society for Optical Engineering. Proceedings,* 1995, Vol.2506, Air pollution and visibility measurements. Edited by P. Fabian et al, p.475-482, 11 refs.

DLC TD890.A365

Atmospheric physics, Climatology, Precipitation (meteorology), Snowfall, Haze, Atmospheric composition, Optical properties, Aerosols, Ice crystal optics, Infrared radiation, Sensors, Remote sensing, Transmissivity, Visibility, Attenuation, Spectra, Statistical analysis

51-2259

Cloud base height determination in rain, snow, and fog with a low-cost eye-safe lidar.

Münkel, C., *SPIE—The International Society for Optical Engineering. Proceedings,* 1995, Vol.2506, Air pollution and visibility measurements. Edited by P. Fabian et al, p.535-542, 1 ref.

DLC TD890.A365

Clouds (meteorology), Cloud height indicators, Lidar, Design, Performance, Transmissivity, Snowfall, Snow optics, Light scattering, Backscattering

51-2260

Determination of the orientation of the ice crystals in a cloud.

Kaul, B.V., Werner, C., Herrmann, H., *SPIE—The International Society for Optical Engineering. Proceedings,* 1995, Vol.2506, Air pollution and visibility measurements. Edited by P. Fabian et al, p.580-587, 6 refs.

DLC TD890.A365

Clouds (meteorology), Cloud physics, Sounding, Snowfall, Snow optics, Ice detection, Ice crystal optics, Orientation, Lidar, Polarization (waves), Backscattering, Statistical analysis

51-2261

Lidar multiple scattering as a tool for cloud microphysical parameters.

Werner, C., Oppel, U., *SPIE—The International Society for Optical Engineering. Proceedings,* 1995, Vol.2506, Air pollution and visibility measurements. Edited by P. Fabian et al, p.598-607, 13 refs.

DLC TD890.A365

Cloud physics, Polar stratospheric clouds, Lidar, Sounding, Aerosols, Ice detection, Scattering, Attenuation, Polarization (waves)

51-2262

Scientific report of Fifth Indian Expedition to Antarctica.

India. Department of Ocean Development, New Delhi, India, 1988, 487p., Technical publication No.5, Refs. passim. For individual papers see B-56615 through B-56618, B-56629, C-56622, D-56592, E-56593 through E-56598, E-56600, E-56605, F-56599, F-56601 through F-56604, F-56606 through F-56609, G-56623 through G-56626, G-56628, I-56610 through I-56614, I-56627, K-56620, I-56621, L-56619 or 51-2263 through 51-2282.

DLC G850.I53 I53

Low temperature research, Research projects, Expeditions

This technical report gives details of the work carried out by members of the Fifth Indian Expedition to Antarctica, from Nov. 1985 to Mar. 1986, in the following disciplines: geology, glaciology, marine biology, meteorology, geophysics, radiophysics, geomagnetism, use of non-conventional sources of energy, remote sensing and logistics. Thirty-eight papers are included.

51-2263

Magnetic and seismic investigations on the ice-shelf around the Indian permanent station in Antarctica.

Jain, S.C., Dhar, R., Reddy, K.N.S., Scientific report of Fifth Indian Expedition to Antarctica, Technical publication No.5, New Delhi, India, Department of Ocean Development, 1988, p.151-155, 4 refs.

DLC G850.I53 I53

Ice shelves, Magnetic surveys, Seismic surveys, Geophysical surveys, Explosives, Antarctica—Dakshin Gangotri Station

Results of magnetic and seismic investigations around the Dakshin Gangotri Station have established the usefulness of geophysical tools in delineating sub-shelf structures. Of the explosives tried so far for selecting a suitable energy source for seismic studies, Low Temperature Plastic Explosives (LTPE) developed by ERDL, Pashan, were found to be the best under sub-zero climatic conditions of Antarctica. (Auth.)

51-2264

Oxygen isotope studies in Antarctica.

Nijampurkar, V.N., Bhattacharya, S.K., Mukerji, S., Singh, R.K., Srivastava, D., Scientific report of Fifth Indian Expedition to Antarctica, Technical publication No.5, New Delhi, India, Department of Ocean Development, 1988, p.171-179, 8 refs.

DLC G850.I53 I53

Snow composition, Ice composition, Glacier ice, Lake ice, Sea ice, Oxygen isotopes, Antarctica—Schirmacher Ponds, Antarctica—Maitri Station

$\delta^{18}O$ measurements of fresh snow, surface ice, shallow ice cores, old ice from the Maitree glacier and fresh water lakes from Schirmacher Ponds and Wohlthat Mountains have been carried out. The mean $\delta^{18}O$ values in fresh snow and surface are around -19 per mill; the old glacier ice and mean values of 18 lake ice samples were -42 and -26 per mill, respectively. The mean annual surface air temperature precipitation of fresh snow and surface ice samples is calculated to be -7°C. The mean values of -19 per mill in fresh snow/ice, -26 per mill in Schirmacher Hills and -42 per mill in old ice of Maitree glacier suggest that the Schirmacher Lakes receive 70% contribution from fresh snow/ice meltwater and about 30% from Maitree glacier old ice meltwater. No systematic cyclic variations have been observed in the 3 shallow ice cores collected from the shelf ice and iceberg. (Auth.)

51-2265

Polar fallout of radioisotopes ^{32}Si, ^{7}Be, ^{210}Pb, ^{137}Cs and ^{239}Pu at Dakshin Gangotri, Antarctica.

Nijampurkar, V.N., Rao, D.K., Scientific report of Fifth Indian Expedition to Antarctica, Technical publication No.5, New Delhi, India, Department of Ocean Development, 1988, p.181-188, 16 refs.

DLC G850.I53 I53

Radioactive isotopes, Snow composition, Ice composition, Fallout, Radioactive age determination, Antarctica—Dakshin Gangotri Station

Radioisotope concentrations were measured in snow samples of the shelf ice near Dakshin Gangotri Station. The annual fallout of cosmic ray produced ^{32}Si—the first measurement of its kind in Antarctica—is estimated to be 3 x 10^{-5} dpm/cm^2/yr, which corresponds to the global production rate of ^{32}Si to be 0.8 x 10^{-4} atoms/cm^2/sec, using half-life of ^{32}Si to be 140 years. This estimate is lower than that calculated by Lal and Peters (1967) which suggests that the life of ^{32}Si is closer to 270 yrs as observed by geophysical methods. The fallout of the other natural radioisotope ^{7}Be and ^{210}Pb are consistent with the earlier work. As expected, the fallout of artificial radioisotopes ^{137}Cs and ^{239}Pu are an order of magnitude lower than the peak production during the nuclear explosions tests conducted during the last 3 decades. (Auth.)

51-2266

Snow accumulation and ablation pattern on ice shelf near Dakshin Gangotri, Antarctica, and development of fast ice off Dakshin Gangotri.

Singh, R.K., Mukerji, S., Srivastava, D., Kaul, M.K., Scientific report of Fifth Indian Expedition to Antarctica, Technical publication No.5, New Delhi, India, Department of Ocean Development, 1988, p.189-204, 2 refs.

DLC G850.I53 I53

Snow accumulation, Ablation, Ice shelves, Fast ice, Ice formation, Ice density, Antarctica—Dakshin Gangotri Station

Variations in the accumulation and ablation patterns of snow of the shelf ice around Dakshin Gangotri Station defined by the wind direction and wind force were studied in the summers of 1985-86 and 1986-87 and in the intervening winter period. The net accumulation of snow/firn recorded was of the order of 18.51 gm/cm^2 of water equivalent in a calendar year. The average density of snow/firn was 0.37 gm/cm^3. Maximum development of fast ice was observed in the month of Jan. 1987 and its average density was recorded as 0.50 gm/cm^3. The maximum ram hardness was of the order of 37 kg. (Auth. mod.)

51-2267

Observations on the changes in the snout of Dakshin Gangotri Glacier, Antarctica.

Kaul, M.K., Singh, R.K., Srivastava, D., Mukerji, S., Jayaram, S., Scientific report of Fifth Indian Expedition to Antarctica, Technical publication No.5, New Delhi, India, Department of Ocean Development, 1988, p.205-209, 1 ref.

DLC G850.I53 I53

Glacier oscillation, Glacier melting, Glacial lakes, Meltwater, Antarctica—Schirmacher Hills

A small polar ice tongue, named Dakshin Gangotri Glacier during the Second Indian Expedition to Antarctica (1982-83), was studied to determine any secular movement the glacier has undergone since 1983. Repeat mapping of the snout was carried out by EDM (electronic distance measuring unit) in 1986 and 1987. Results obtained are compared to those obtained during earlier studies. (Auth.)

51-2268

Some observations on the glacial geomorphological features of Wohlthat Mountains, central Queen Maud Land, Antarctica.

Srivastava, D., Kaul, M.K., Singh, R.K., Mukerji, S., Jayaram, S., Scientific report of Fifth Indian Expedition to Antarctica, Technical publication No.5, New Delhi, India, Department of Ocean Development, 1988, p.211-218, 3 refs.

DLC G850.I53 I53

Glacial geology, Geomorphology, Limnology, Moraines, Glaciation, Topographic features, Ice sheets, Antarctica—Wohlthat Mountains

The part of central Queen Maud Land, at the Dakshin Gangotri Station's shelf and about 200 km inland, encompasses four distinct geomorphological units: the shelf area, the piedmont zone, the mountain barrier and the polar ice plateau. Glacial geomorphological features of the mountain barrier, formed by the Wohlthat Mountains, were studied during the Fifth Indian Expedition to Antarctica and are described in this paper. The prominent features include the differential relief, various types of moraines, wind scoops and desert weathering (honeycomb features). Level of glaciation has been inferred and several features associated with deglaciation are described. (Auth.)

51-2269

Glaciochemical studies in Antarctica.

Nijampurkar, V.N., Scientific report of Fifth Indian Expedition to Antarctica, Technical publication No.5, New Delhi, India, Department of Ocean Development, 1988, p.219-224, 10 refs.

DLC G850.I53 I53

Snow composition, Ice composition, Lake water, Water chemistry, Meltwater, Antarctica—Wohlthat Mountains

Concentrations of some major ions (Na, K, Cl) and heavy metals (Fe, Co, Ni, Ca, Mg, Zn, Cu, Pb and Cd) of 10 snow, ice and lake water samples collected near Dakshin Gangotri Station were determined. The concentrations of major ions are normalized to Na. These ratios, similar to those of seawater, indicate that the snow/ice/lake water samples are influenced by marine salts. High Cl/Na ratios were found in Maitree glacier ice and Wohlthat lake water. The concentrations of heavy metals Zn, Cu, Pb, Cd, Co, Ni were below the detection limit indicating no significant anthropogenic contribution in the region investigated. (Auth. mod.)

51-2270

Radioactivity studies in Antarctica.

Nijampurkar, V.N., Rao, D.K., Kaul, M.K., Mukerji, S., Singh, R.K., Srivastava, D., Scientific report of Fifth Indian Expedition to Antarctica, Technical publication No.5, New Delhi, India, Department of Ocean Development, 1988, p.225-233, 6 refs.

DLC G850.I53 I53

Ice cores, Radioactivity, Snow composition, Snow accumulation, Ice composition, Lake water, Water chemistry, Antarctica—Dakshin Gangotri Station

The variation of ^{7}Be, ^{210}Pb, ^{137}Cs and total beta activity has been studied in antarctic shallow ice core samples (up to 9 m depth), fresh snow, surface ice samples and fresh lakewater samples collected near the Dakshin Gangotri Station. Based on the ^{210}Pb, ^{137}Cs and total beta activity measurements in shallow ice core samples, past accumulation rate of snow has been estimated to be 13.5 g/cm^2/yr (0.3 m/yr). (Auth.)

51-2271

Glacier inventory of Wohlthat Mountain chain, Queen Maud Land, Antarctica.

Srivastava, D., Kaul, M.K., Singh, R.K., Mukerji, S., Jayaram, S., Scientific report of Fifth Indian Expedition to Antarctica, Technical publication No.5, New Delhi, India, Department of Ocean Development, 1988, p.235-245, 3 refs.

DLC G850.I53 I53

Glaciers, Distribution, Classifications, Altitude, Mapping, Glacier surveys, Antarctica—Wohlthat Mountains

The paper summarizes the results of glacier surveys carried out in the Wohlthat Mountains lying between 9°-14°E and 71°10'-72°S. The inventory is based on a 1:250,000 scale topographic map, Landsat imagery, reconnaissance vertical aerial photography during 1985-86 expedition, and limited ground checks. A total of 122 glaciers have been identified, numbered and classified. (Auth.)

51-2272

Ice flow conditions in the ice sheet draining part of the central Queen Maud Land, East Antarctica.

Kaul, M.K., Singh, R.K., Srivastava, D., Mukerji, S., Jayaram, S., Scientific report of Fifth Indian Expedition to Antarctica, Technical publication No.5, New Delhi, India, Department of Ocean Development, 1988, p.247-256, 4 refs.

DLC G850.I53 I53

Ice sheets, Flow rate, Glacier surfaces, Glacier flow, Ice shelves, Calving, Bedrock, Rheology, Antarctica—Queen Maud Land

The present-day ice flow conditions of central Queen Maud Land have been studied to determine the dynamics of this segment of antarctic ice sheet. The flow direction of the inland polar ice, as observed in the field, and the location of the grounding line is demarcated, based on surface studies. Coordination of 4 stakes fixed on the margin of the inland ice on experimental basis, has revealed movement of the ice varying from a minimum of 0.031 m to a maximum of 1.91 m per day, based on 1-year observations. The outline of a part of shelf ice surveyed (Jan.-Feb. 1986) and compared with the satellite imagery of 1975, shows very little change. (Auth. mod.)

51-2273

Meteorological studies at Antarctica during the period March, 1986 to February, 1987.

Rao, T.V.P.B., Scientific report of Fifth Indian Expedition to Antarctica, Technical publication No.5, New Delhi, India, Department of Ocean Development, 1988, p.259-281, 2 refs.

DLC G850.I53 I53

Weather observations, Meteorological data, Weather stations, Meteorological instruments, Snowstorms, Antarctica—Dakshin Gangotri Station

A permanently manned meteorological observatory was established at Dakshin Gangotri Station during the 3rd Indian expedition to Antarctica, for continuous recording of meteorological parameters. Monthly averages and extreme values of pressure, temperature, wind speed and monthly blizzard frequency are given for the period Mar. 1, 1986 to Feb. 15, 1987. Analysis shows that Jan. 1987 was the warmest, and July 1986, the coldest month with average temperatures of -1.9°C and -30.3°C, respectively. During the previous two winters, Aug. was the coldest month, with average monthly temperatures of -32.6°C (1984) and -33°C (1985). The monthly average temperatures in Jan. 1985 and 1986 were -2.2°C and -3.0°C, respectively. (Auth. mod.)

51-2274

Blizzard storms: coastal regions of Indian antarctic station, Dakshin Gangotri (1985-1986 summer).

Sharma, A.C., Scientific report of Fifth Indian Expedition to Antarctica, Technical publication No.5, New Delhi, India, Department of Ocean Development, 1988, p.283-287.

DLC G850.I53 I53

Weather observations, Weather forecasting, Meteorological data, Snowstorms, Antarctica—Dakshin Gangotri Station

The 5th Indian expedition experienced one of the worst summer seasons in Antarctica. Out of a total stay of 69 days at Dakshin Gangotri Station the occurrence of either blizzards or strong winds was recorded on 45 days. Weather forecasts based on the available instruments made it possible to accomplish the various assigned tasks. In this paper, a systematic synoptic study of weather conditions, highlighting the blizzard storms at Dakshin Gangotri Station in the summer of 1985-86, is discussed. (Auth. mod.)

51-2275

Automatic weather station at Dakshin Gangotri, Antarctica.

Apte, N.Y., Rao, T.V.P.B., Scientific report of Fifth Indian Expedition to Antarctica, Technical publication No.5, New Delhi, India, Department of Ocean Development, 1988, p.289-297, 2 refs.

DLC G850.I53 I53

Weather stations, Meteorological instruments, Weather observations, Low temperature research, Cold weather construction, Antarctica—Dakshin Gangotri Station

The India Meteorological Department has set up an automatic weather station known as Data Collection Platform (DCP) at Dakshin Gangotri Station during the 5th Indian expedition. The weather parameters at each GMT hour are sensed by the system and transmitted to the Meteorological Data Utilisation Centre at New Delhi on real time basis, through Indian National Satellite (INSAT-1B). In this paper, a detailed description of the data collection platform system, the sensors used in the system and the difficulties experienced during installation of this system are highlighted. The data received from DCP is compared with manual observations recorded at the station. The results are found to be encouraging. The difficulties arising in maintaining the system in extreme weather are also discussed. (Auth. mod.)

51-2276

Typical meteorological and oceanological situations encountered during the Fifth Indian Scientific Expedition to Antarctica (1985-86).

Singh, S., Scientific report of Fifth Indian Expedition to Antarctica, Technical publication No.5, New Delhi, India, Department of Ocean Development, 1988, p.303-308, 4 refs.

DLC G850.I53 I53

Weather observations, Meteorological data, Storms, Sea ice distribution, Polynyas, Antarctica—Dakshin Gangotri Station

During the 5th Indian expedition, round the clock meteorological data were collected on board the MV *Thuleland*, to and from Antarctica, and during the stay in a polynya near Dakshin Gangotri Station. The paper highlights some of the prominent meteorological conditions encountered, including two severe storms during the ship's return journey. Extreme values of meteorological parameters recorded in the polynya are also given. (Auth. mod.)

51-2277

Seasonal variation in particulate organic matter and its constituent fractions under the ice covered sea near the shelf, Antarctica.

Dhargalkar, V.K., Scientific report of Fifth Indian Expedition to Antarctica, Technical publication No.5, New Delhi, India, Department of Ocean Development, 1988, p.331-339, Refs. p.337-339.

DLC G850.I53 I53

Marine biology, Particles, Plankton, Ice cover effect, Antarctica—Princess Astrid Coast

Particulate organic matter (POM) collected at a single station in the shelf waters of Princess Astrid Coast from May to Dec. 1986 was analyzed for chl *a*, POC and other constituent fractions at 3 discrete depths. Chl *a* concentration at all the 3 depths varied from 0.026 to 0.253 μg/l showing minimum values during Aug.-Sep. POC values varied from 280 to 1058 μg/l while its constituent fractions such as particulate carbohydrates (PCHO), particulate proteins (PP) and particulate lipids (PL) varied from 14 to 193, 6 to 200 and 8 to 174 μg/l, respectively. Significant correlation existed between POC and chl *a*, PP and PL at 10 m depth. This was in contrast to PCHO and chl *a*. The components studied showed seasonal variation suggesting that the sea ice microalgae and planktonic organisms contribute substantially to particulate organic carbon. (Auth.)

51-2278

Remote sensed data analysis for geology and glacial geology of Wohlthat Muhlig-Hofmann mountain chain in Queen Maud Land, East Antarctica.

Nath, A.N., Scientific report of Fifth Indian Expedition to Antarctica, Technical publication No.5, New Delhi, India, Department of Ocean Development, 1988, p.385-418, 6 refs.

DLC G850.I53 I53

Remote sensing, Ice surveys, Sea ice, Ice sheets, Subglacial drainage, Glacial geology, Topographic surveys, Mapping, Imaging, Antarctica—Wohlthat Mountains, Antarctica—Mühlig-Hofmann Mountains

During the Fifth Indian Expedition to Antarctica, aerial surveys were conducted over the Schirmacher Hills and Gruber and Petermann massives in eastern part of the Wohlthat Mountains. Spectral signatures of sea-ice, fast-ice, shelf-ice, continental-ice and lithological units were collected. Maps on a 1:250,000 scale for the region covering the area from 3°E to 21°E were prepared. The main drainage glaciers, the local glaciers and their associated morainic deposits were identified. Sastrugi fields, nunataks, solid crystalline blue ice fields, their distribution, melt water channels, and grounded ice have been demarcated. Thermal mapping of Schirmacher Hills was also conducted. Digital analysis to classify the rock types, to enhance the structural features, to differentiate the occurrence of various types of ice sheets and locate the solid crystalline ice fields which are typically associated with nunataks and mountains, has been carried out. (Auth. mod.)

51-2279

Clothing for Antarctica.

Chatterjee, G.N., Agarwal, R.P., Tandon, V.K., Banerjee, B.K., Scientific report of Fifth Indian Expedition to Antarctica, Technical publication No.5, New Delhi, India, Department of Ocean Development, 1988, p.421-432, Refs. p.431-432.

DLC G850.I53 I53

Low temperature research, Clothing, Thermal insulation, Antarctica—Dakshin Gangotri Station

The experience of the members of the Fifth Indian Expedition with clothing for antarctica, developed and supplied by the Indian Defence Research and Development organization, is described. The optimum requirements of clothing in Antarctica (at locations of Indian activities) are discussed. The clothing supplied has been found to meet their thermal protection needs during the antarctic winter adequately. (Auth. mod.)

51-2280

Fracture and fatigue studies on mild and structural steels for use in Antarctica.

Vijayakar, S., Scientific report of Fifth Indian Expedition to Antarctica, Technical publication No.5, New Delhi, India, Department of Ocean Development, 1988, p.433-441, 1 ref.

DLC G850.I53 I53

Steels, Steel structures, Low temperature research, Fatigue (materials), Fracturing, Hardness tests, Cold weather tests, Antarctica—Dakshin Gangotri Station, Antarctica—Schirmacher Hills

This study was intended to determine the usability of ordinary mild and structural steels in antarctic climatic conditions. An attempt was made to improve the fatigue and fracture toughness characteristics of such metals for the above use. The effect of hydrogen removal on the Kpop-in value and the resulting fatigue crack growth rate and fatigue life of the metal specimen were determined. An improvement in pop-in characteristics has been found. (Auth.)

51-2281

Experiments on harnessing non-conventional energy sources in Antarctica.

Ramakrishnan, K.C., Scientific report of Fifth Indian Expedition to Antarctica, Technical publication No.5, New Delhi, India, Department of Ocean Development, 1988, p.445-453, 1 refs.

DLC G850.I53 I53

Low temperature research, Cold weather construction, Cold weather tests, Solar radiation, Meteorological factors, Wind power generation, Albedo, Antarctica—Dakshin Gangotri Station, Antarctica—Schirmacher Hills

During the Fifth Indian Expedition to Antarctica, an experimental model of the Solar Photovoltaic (SPV) system designed and developed by the Bharat Heavy Electricals Limited was tested at Dakshin Gangotri Station and the Schirmacher Hills. This paper discusses the experimental results. Performance of the system was found to be better in Antarctica compared to that in India. Possible reasons for this, and the effect of albedo on the SPV system performance, is also discussed. Due to lack of data on the solar radiation components and other few meteorological parameters for the period of testing, the experimental results are mostly confined to qualitative analysis. A feasibility study for the wind energy conversion system was also carried out. (Auth. mod.)

51-2282

Mineralising snow-melt water.

Banerjee, B.K., Scientific report of Fifth Indian Expedition to Antarctica, Technical publication No.5, New Delhi, India, Department of Ocean Development, 1988, p.457-464, 10 refs.

DLC G850.I53 I53

Water supply, Meltwater, Minerals, Admixtures, Water chemistry, Antarctica—Dakshin Gangotri Station

In Antarctica, due to poor thirst drive and lack of taste in the local freshwater, the water needs of the human body tend to get neglected. Synthetic mineral tablets were developed by the Defence Laboratory, Jodhpur to restore the taste to snowmelt water. The treated water was subjected to a practical user trial in Antarctica during the 5th expedition with favorable results. Most of the expedition members liked the taste of the mineralized water and found it satisfying. (Auth.)

51-2283

Sedimentological study of the sea bottom sediments in and around the Ross Sea continental shelf, Antarctica.

Nishimura, A., Yuasa, M., Nakasone, T., Nakahara, M., Ioka, N., NIPR Symposium on Antarctic Geosciences, Proceedings. No.9, Tokyo, National Institute of Polar Research, 1996, p.117-126, 18 refs.

Marine geology, Bottom sediment, Glacial geology, Stratigraphy, Antarctica—Ross Sea

Sediment cores collected in and around the Ross Sea are described and discussed based on visual observations, sedimentary structures, magnetic susceptibility, sand contents, and water content. On the Ross Sea continental shelf, the core sequences contain two lithologic units, soft diatomaceous mud in the upper and compound glaciomarine sediments in the lower. The lower lithologic unit suggests that ice-sheet-influenced sedimentation existed in glacial times in the Ross Sea. The core sequences on the continental slope and deep-sea basins off the Ross Sea comprise foraminiferal ooze, siliceous mud, and terrigenous mud, sometimes with laminated parts. The laminated parts of the core sequences suggest that strengthened bottom water influenced sedimentation, probably in glacial times. The sedimentary environment in the Late Quaternary is reconstructed based on the core data. (Auth.)

51-2284

Areal and vertical variation of heavy mineral composition of the surface sediments, Ross Sea, Antarctica.

Tokuhashi, S., Agyingi, C.M., Nishimura, A., NIPR Symposium on Antarctic Geosciences, Proceedings. No.9, Tokyo, National Institute of Polar Research, 1996, p.127-140, 18 refs.

Marine geology, Bottom sediment, Minerals, Glacial geology, Glacial deposits, Glacier flow, Antarctica—Ross Sea

Results are presented of heavy-mineral analysis of ice-rafted sand fractions of muddy sediments from several gravity cores collected in the Ross Sea. The samples were collected from two levels of the cores, late Holocene S-group samples, in the upper part, and last glacial to Early Holocene D-group samples, in the lower part of the cores. Both the S-group and D-group show the same kind of heavy minerals and the same distribution pattern of the frequency of those minerals. These patterns suggest the existence of at least two petrographic provinces, the western and the central-eastern areas. It is suggested that the olivine and clinopyroxene with titanaugite, dominantly distributed in the western area, were probably supplied from the Late Quaternary McMurdo alkaline basaltic volcanics fringing the eastern margin of Victoria Land. The strong similarity of the distribution pattern of heavy mineral composition between the S-group and D-group samples suggests the long-term stability of flow patterns of icebergs in the Ross Sea. (Auth. mod.)

51-2285

Albedo and depth of melt ponds on sea-ice.

Morassutti, M.P., LeDrew, E.F., *International journal of climatology,* July 1996, 16(7), p.817-838, 41 refs.

Sea ice, Surface structure, Optical properties, Albedo, Reflectivity, Ponds, Water level, Ice melting, Ice water interface, Topographic effects, Insolation, Spaceborne photography, Spectroscopy, Statistical analysis, Correlation

51-2286

Non-structural carbohydrates in *Deschampsia antarctica* Desv. from South Shetland Islands, Maritime Antarctic.

Zuñiga, G.E., Alberdi, M., Corcuera, L.J., *Environmental and experimental botany,* Dec. 1996, 36(4), p.393-399, 31 refs.

Plant ecology, Plant physiology, Plant tissues, Cold tolerance, Frost resistance, Cold weather survival, Grasses, Chemical analysis, Antarctica—South Shetland Islands

Deschampsia antarctica Desv. (Angiosperm: family Graminaceae) plants were collected from Robert I., South Shetland Is., during Feb. 1992 and Jan. 1993 and were extracted with 80% ethanol. Total soluble sugars were analyzed in leaves and roots by colorimetric and HPLC techniques. Compared with other gramineae, the levels of sucrose and fructans were higher. These substances reached their maximum levels by the end of summer. The levels of sucrose and fructans found in Feb. 1992 were twice the level found in Jan. 1993. The unusually high accumulation of sucrose and fructans may be one of the protective mechanisms against low temperature that has allowed *D. antarctica* to grow in the maritime Antarctic. (Auth. mod.)

51-2287

Local phase transitions and filtration as determinants of the rheology of flowing frozen ground.

Vlasov, A.N., Merzliakov, V.P., Savatorova, V.L., Talonov, A.V., Ukhov, S.B., *Physics—Doklady,* Aug. 1996, 41(8), p.374-376, Translated from Doklady Akademii Nauk. 10 refs.

Frozen ground expansion, Rheology, Soil structure, Microstructure, Deformation, Hydrology, Phase transformations, Moisture transfer, Ice melting, Meltwater, Mathematical models, Seepage

51-2288

Spatial trends and historical deposition of polychlorinated biphenyls in Canadian midlatitude and arctic lake sediments.

Muir, D.C.G., et al, *Environmental science & technology,* Dec. 1996, 30(12), p.3609-3617, 49 refs.

Water pollution, Lacustrine deposits, Sedimentation, Hydrocarbons, Statistical analysis, Isotope analysis, Drill core analysis, Profiles, Origin, Seasonal variations, Environmental tests, Canada—Northwest Territories—Hazen Lake, Canada—Northwest Territories—Sophia Lake

51-2289

Freeze-drying stops sludge problems cold.

Weir, R.K., *Opflow,* Aug. 1996, 22(8), p.1,3-4.

Sludges, Freeze drying, Water treatment, Waste disposal, Pumps, Performance, Cost analysis

51-2290

Growth variation of Scots pine across a pollution gradient on the Kola Peninsula, Russia.

Nöjd, P., Reams, G.A., *Environmental pollution,* Nov. 1996, 93(3), p.313-325, 48 refs.

Subpolar regions, Air pollution, Mining, Aerosols, Trees (plants), Forest ecosystems, Plant ecology, Growth, Damage, Classifications, Environmental impact, Environmental tests, Statistical analysis, Russia—Kola Peninsula

51-2291

Growth and vitality of epiphytic lichens. 1. Response to microclimate along a forest edge-interior gradient.

Renhorn, K.E., Esseen, P.A., Palmqvist, K., Sundberg, B., *Oecologia,* Jan. 1, 1997, 109(1), p.1-9, 40 refs.

Subarctic landscapes, Lichens, Plant ecology, Forest lines, Microclimatology, Climatic changes, Growth, Photosynthesis, Plant tissues, Water balance, Biomass, Simulation, Statistical analysis

51-2292

Freezing-induced xylem cavitation and the northern limit of *Larrea tridentata*.

Pockman, W.T., Sperry, J.S., *Oecologia,* Jan. 1, 1997, 109(1), p.19-27, 51 refs.

Plant ecology, Trees (plants), Plant physiology, Cold tolerance, Frost resistance, Plant tissues, Damage, Cavitation, Cold weather tests, Temperature effects, Vegetation patterns, Distribution

51-2293

Dual-frequency Topex altimeter observations of Greenland.

Remy, F., Legresy, B., Bleuzen, S., Vincent, P., Minster, J.F., *Journal of electromagnetic waves and applications,* Nov. 1996, 10(11), p.1507-1525, 26 refs.

Ice sheets, Topographic surveys, Airborne radar, Radar echoes, Backscattering, Wave propagation, Height finding, Accuracy, Snow cover effect, Surface roughness, Simulation, Analysis (mathematics)

51-2294

Interstellar dust evolution: a reservoir of prebiotic molecules.

Greenberg, J.M., Mendoza-Gómez, C.X., NATO Advanced Study Institute, Erice, Sicily, Italy, Oct. 20-30, 1991. Proceedings. Chemistry of life's origins. Edited by J.M. Greenberg et al and NATO Advance Science Institutes, Series C. Mathematical and Physical Sciences. Vol.416, Dordrecht, Kluwer Academic Publishers, 1993, p.1-32, Refs. p.27-32.
DLC QB450.C546

Ecology, Cosmic dust, Extraterrestrial ice, Optical properties, Hydrocarbons, Radiation absorption, Photochemical reactions, Chemical analysis, Life (durability), Geochemistry, Theories

51-2295

Laboratory simulations of grain icy mantles processing by cosmic rays.

Pirronello, V., NATO Advanced Study Institute, Erice, Sicily, Italy, Oct. 20-30, 1991. Proceedings. Chemistry of life's origins. Edited by J.M. Greenberg et al and NATO Advance Science Institutes, Series C. Mathematical and Physical Sciences. Vol.416, Dordrecht, Kluwer Academic Publishers, 1993, p.33-53, Refs. p.51-53.
DLC QB450.C546

Cosmic dust, Extraterrestrial ice, Gamma irradiation, Radiation absorption, Geochemistry, Photochemical reactions, Ice optics, Molecular structure, Phase transformations, Ionization, Simulation, Theories

51-2296

Characterization of snow grain size in the near-infrared and microwave wavelengths.

Nolin, A.W., Shi, J.C., Dozier, J., Topical Symposium on Combined Optical-Microwave Earth and Atmosphere Sensing, Albuquerque, NM, Mar. 22-25, 1993. Proceedings, Piscataway, Institute of Electrical and Electronics Engineers, 1993, p.51-54, 16 refs.
DLC G70.39.T67

Snow optics, Ice crystal optics, Snow cover structure, Remote sensing, Grain size, Infrared radiation, Microwaves, Reflectivity, Particle size distribution, Backscattering, Correlation

51-2297

Microwave/optical studies of saline ice, snow, melt ponds and refrozen melt pond ice.

Bredow, J., Gibbs, D., Betty, C., Fung, A.K., Gogineni, S., Topical Symposium on Combined Optical-Microwave Earth and Atmosphere Sensing, Albuquerque, NM, Mar. 22-25, 1993. Proceedings, Piscataway, Institute of Electrical and Electronics Engineers, 1993, p.70-73.
DLC G70.39.T67

Snow optics, Ice optics, Salt ice, Remote sensing, Microwaves, Backscattering, Refractivity, Ponds, Regelation, Bubbles, Gas inclusions, Simulation

51-2298

On links between microwave and shortwave signatures of multiyear sea ice during the onset of melt.

Winebrenner, D., et al, Topical Symposium on Combined Optical-Microwave Earth and Atmosphere Sensing, Albuquerque, NM, Mar. 22-25, 1993. Proceedings, Piscataway, Institute of Electrical and Electronics Engineers, 1993, p.74-77, 15 refs.
DLC G70.39.T67

Sea ice, Ice melting, Ice temperature, Surface temperature, Radiometry, Synthetic aperture radar, Backscattering, Albedo, Ice optics, Snow cover effect, Correlation

51-2299

Analysis of combined optical and microwave data for the characterization of sea ice.

Tanis, F.J., Onstott, R.G., Topical Symposium on Combined Optical-Microwave Earth and Atmosphere Sensing, Albuquerque, NM, Mar. 22-25, 1993. Proceedings, Piscataway, Institute of Electrical and Electronics Engineers, 1993, p.78-81, 5 refs.
DLC G70.39.T67

Sea ice, Optical properties, Ice optics, Albedo, Microwaves, Lasers, Scattering, Snow cover effect, Simulation, Ice forecasting

51-2300

Investigation of the arctic aerosol pollution.

Vinogradova, A.A., Malkov, I.P., Polissar, A.V., *SPIE—The International Society for Optical Engineering. Proceedings,* 1993, Vol.2107, Optical monitoring of the environment. Edited by N.N. Belov et al, p.203-211, 16 refs.
DLC TD193.O68

Polar atmospheres, Air pollution, Atmospheric boundary layer, Air masses, Aerosols, Sampling, Atmospheric composition, Origin, Air flow, Statistical analysis, Correlation

51-2301

Scientific report, Tenth Indian Expedition to Antarctica.

India. Department of Ocean Development, New Delhi, India, 1995, 297p., Technical publication No.8, Refs. passim. For individual papers see B-56647, B-56649 through B-56652, C-56643, C-56644, D-56633, E-56640 through E-56642, G-56648, G-56656, G-56657, H-56653 through H-56655, I-56634 through I-56638, I-56646, L-56639, L-56645 or 51-2302 through 51-2307.

Low temperature research, Research projects, Expeditions, Antarctica—Dakshin Gangotri Station, Antarctica—Maitri Station

This technical report gives details of the work carried out by members of the Tenth Indian Expedition to Antarctica, from Nov. 1990 to Feb. 1992. The scientific papers incorporated in this issue cover atmospheric science, bio-science, earth science, human physiology, oceanography, and polar horticulture. Twenty-five papers are included; the first is a review of the expedition, and the last two deal with the expedition's logistics.

51-2302

UV-B radiation intensity measurements at Antarctica.

Hanjura, A.K., Singh, R., Scientific report, Tenth Indian Expedition to Antarctica, Technical publication No.8, New Delhi, India, Department of Ocean Development, 1995, p.17-34, 15 refs.

Ultraviolet radiation, Ozone, Aerosols, Meteorological instruments, Meteorological factors, Antarctica—Maitri Station

The UV-B radiation intensity measurements, at various wavelengths, were carried out at different time slots from Jan. 1987 to Feb. 1992. The analysis of these observations shows that, in addition to atmospheric ozone, the other factors like cloud scattering and aerosol scattering also play an important role in affecting the solar UV-B intensities. It is found that due to these additional factors, the anti-correlation factor between atmospheric ozone content and UV-B intensity is different for different atmospheric conditions over the Maitri Station. (Auth.)

51-2303

Report on meteorological programme during summer period of Tenth Indian Expedition to Antarctica.

Sharma, R.K., Scientific report, Tenth Indian Expedition to Antarctica, Technical publication No.8, New Delhi, India, Department of Ocean Development, 1995, p.55-70.

Weather observations, Climatic factors, Ozone, Meteorological data, Snowstorms, Ice shelves, Antarctica—Maitri Station

The antarctic weather influences the global climate to a great extent. In order to study meteorological features over Antarctica and correlate these with Indian weather, the meteorological observational program of the India Meteorological Department has been a regular component of each Indian expedition to Antarctica. The major objectives of the summer meteorological program of the 10th expedition are listed, and results are discussed and presented in tables. (Auth. mod.)

51-2304

Meteorological studies carried out at Maitri during winter period of Tenth Indian Scientific Expedition to Antarctica.

Gulhane, P.M., Katariya, S.S., Scientific report, Tenth Indian Expedition to Antarctica, Technical publication No.8, New Delhi, India, Department of Ocean Development, 1995, p.71-91.

Weather observations, Ozone, Air temperature, Solar radiation, Snowstorms, Meteorological data, Antarctica—Maitri Station

Extensive meteorological observations, comprising surface and upper air parameters and total and vertical ozone profiles, taken on board ship and at Maitri Station during 1991, are discussed. Data show that Aug. was the coldest month, with a lowest monthly mean air temperature of -17.0°C. A total of 15 blizzards occurred during

27 days; warmer air temperatures were recorded during the blizzards. The effects of antarctic climate on global climate are considered. (Auth. mod.)

51-2305

Report on the participation by the Bhabha Atomic Research Centre in the Tenth Indian Expedition to Antarctica.

Ramachandran, T.V., Balani, M.C., Scientific report, Tenth Indian Expedition to Antarctica, Technical publication No.8, New Delhi, India, Department of Ocean Development, 1995, p.159-180, 13 refs.

Atmospheric composition, Radioactivity, Impurities, Meteorological data, Ice, Snow, Environmental tests, Ecology, Antarctica—Maitri Station

The antarctic continent can be expected to provide reference levels for all environmental and pollution studies due to its remoteness and restricted human activities. The Bhabha Atomic Research Centre (BARC) has participated in the 10th expedition primarily to collect background baseline data on natural radioactivity, heavy metal concentration in soil and water, and biological specimens. While radioactivity data and some limited heavy metal concentration data have already been collected in air, water and soil samples during the 8th and 9th expeditions, this is the first time BARC made attempts to collect biological samples as well. Fairly complete data were obtained from samples and are presented in this report. The analytical procedures followed at BARC, mainly approved standardization techniques, are described. (Auth. mod.)

51-2306

Fire protection - Indian stations at Antarctica: Maitri and Dakshin Gangotri hangar accommodations.

Chatterjee, P., Scientific report, Tenth Indian Expedition to Antarctica, Technical publication No.8, New Delhi, India, Department of Ocean Development, 1995, p.283-291.

Fires, Protection, Equipment, Stations, Logistics, Antarctica—Maitri Station, Antarctica—Dakshin Gangotri Station

Fire is the greatest safety hazard in Antarctica because of the dry climate. The fire protection system at Maitri and Dakshin Gangotri stations has been evaluated and the weak points identified. Recommendations are made for safety of men and material; fire drills are proposed. (Auth.)

51-2307

Report on R&DE(E) tasks during Tenth Antarctic Expedition.

Bhatia, S., Scientific report, Tenth Indian Expedition to Antarctica, Technical publication No.8, New Delhi, India, Department of Ocean Development, 1995, p.293-297.

Cold weather construction, Buildings, Low temperature research, Cold storage, Maintenance, Equipment, Antarctica—Maitri Station

As a part of an expansion program at Maitri Station, plans for certain additional facilities carried out during the 10th Indian expedition are described, and related tasks allotted to the members of the expedition are outlined.

51-2308

World ozone dilemma: research and results with remote sensing.

Hurtak, J.J., *International journal of energy, environment, economics,* 1991, 1(3), p.209-218, 53 refs.

DLC TD195.E49 I57 1 1991 1-3

Ozone, Measuring instruments, Atmospheric composition, Stratosphere, Remote sensing, Aircraft, Antarctica—Antarctic Peninsula

In order to study the chemically perturbed region of the Antarctic and the Arctic, NASA initiated airborne and satellite imaging of the ozone depletion through the specialized ER-2 plane (at ≈18 km) and the modified DC-8-72 aircraft (at ≈12.5 km) with remote sensing systems onboard. Instruments onboard the aircraft surveyed the atmosphere from various altitudes and instruments on the Nimbus-7 satellite analyzed reflected sunlight. Measurements were designed to gauge not only the extent of ozone depletion over the Antarctic/Arctic, but other chemical changes in the stratosphere. Activities carried out within programs of remote sensing and *in situ* measurements by aircraft are compared to TOMS onboard the Nimbus-7, as well as Dobson network ground stations. Through these methods, scientists have been extremely successful in mapping the huge hole in the ozone layer that appeared over Antarctica, which is particularly extensive for about two months of each year and to confirm ozone loss in the arctic area. (Auth.)

51-2309

Late Holocene 'mineral palsas' from associated vegetation patterns: a case study from Lac Hendry, northern Québec, Canada and significance for European Pleistocene thermokarst.

Worsley, P., Gurney, S.D., Collins, P.E.F., *Quaternary science reviews,* Mar. 1995, 14(2), p.179-192, Refs. p.191-192.

Pleistocene, Quaternary deposits, Landforms, Geomorphology, Thermokarst development, Frost mounds, Permafrost transformation, Discontinuous permafrost, Frost heave, Taliks, Paleoecology, Sampling, Thermokarst development, Canada—Quebec—Lac Hendry

51-2310

Mechanisms affecting macroalgal zonation in the northern Baltic Sea.

Kiirikki, M., *European journal of phycology,* Aug. 1996, 31(3), p.225-232, 46 refs.

Marine biology, Subpolar regions, Ecosystems, Algae, Distribution, Littoral zone, Transparence, Ice floes, Drift, Ice erosion, Water waves, Damage, Sampling, Baltic Sea

51-2311

Phytosociology and gradient analysis of a subalpine treed fen in Rocky Mountain National Park, Colorado.

Johnson, J.B., *Canadian journal of botany,* Aug. 1996, 74(8), p.1203-1213, With French summary. Refs. p.1212-1213.

Wetlands, Plant ecology, Ecosystems, Peat, Alpine landscapes, Vegetation patterns, Distribution, Classifications, Ground water, Water balance, Topographic effects, Microrelief, United States—Colorado—Rocky Mountain National Park

51-2312

Sludge chemical composition changes under unidirectional freezing.

Hung, W.T., Chang, I.L., Lee, D.J., Hong, S.G., *Water science & technology,* Aug. 1996, 34(3-4), Biennial Conference of the International Association on Water Quality, 18th, Singapore, June 23-28, 1996. Selected Proceedings, Pt.2, p.525-531, 11 refs.

Water treatment, Sludges, Polymers, Freeze thaw cycles, Chemical composition, Freezing rate, Freezing front, Ice water interface, Sediments, Mass transfer, Migration, Simulation, Infrared spectroscopy

51-2313

Natural radionuclide fluxes and their contribution to defining licensing criteria for deep geological repositories for radioactive wastes.

Miller, B., Smith, G., Savage, D., Towler, P., Wingefors, S., *Radiochimica acta,* 1996, Vol.74, Conference on Chemistry and Migration Behaviour of Actinides and Fission Products in the Geosphere, 5th, 1995, Saint Malo, France. Proceedings. MIGRATION 95, p.289-295, 12 refs.

Radioactive wastes, Waste disposal, Hydrogeology, Reservoirs, Seepage, Weathering, Glacier oscillation, Glacial erosion, Radioactivity, Mass transfer, Air pollution, Environmental protection, Forecasting, Simulation

51-2314

Explaining a sharp transition from sedgeland to alpine vegetation on Mount Sprent, southwest Tasmania.

Kirkpatrick, J.B., Nunez, M., Bridle, K., Chladil, M.A., *Journal of vegetation science,* Oct. 1996, 7(5), p.763-768, 11 refs.

Plant ecology, Vegetation patterns, Distribution, Alpine landscapes, Biogeography, Meteorological factors, Climatic factors, Surface temperature, Temperature inversions, Weather observations, Temperature effects, Australia—Sprent, Mount

51-2315

Cyclic sedimentation of carbonate and siliciclastic deposits on a Late Precambrian ramp: the Elisabeth Bjerg Formation (Eleonore Bay Supergroup), East Greenland.

Tirsgaard, H., *Journal of sedimentary research,* July 1996, 66(4), p.699-712, 59 refs.

Marine geology, Earth crust, Sedimentation, Marine deposits, Sea level, Pleistocene, Stratigraphy, Lithology, Geochronology, Periodic variations, Greenland—Elisabeth Bjerg Formation

51-2316

Spatial uniformity of sediment accumulation in varved lake sediments in northern Sweden.

Petterson, G., Renberg, I., Geladi, P., Lindberg, A., Lindgren, F., *Journal of paleolimnology,* 1993, 9(3), p.195-208, Refs. p.206-208.

Limnology, Paleoclimatology, Lacustrine deposits, Sedimentation, Drill core analysis, Periodic variations, Diagenesis, Image processing, Statistical analysis, Sweden

51-2317

Sedimentological and stratigraphic investigations of a sequence of 106 varves from glacial Lake Assiniboine, Saskatchewan.

Wolfe, B., Teller, J.T., *Journal of paleolimnology,* 1993, 9(3), p.257-273, 29 refs.

Limnology, Glacial lakes, Glacial geology, Lake bursts, Meltwater, Runoff, Seasonal variations, Pleistocene, Lacustrine deposits, Sampling, Stratigraphy, Sedimentation, Grain size, Geochronology, Canada—Saskatchewan

51-2318

Radionuclides in the benthofauna of the region of location of the nuclear submarine *Komsomolets* in the Norwegian Sea.

Kuznetsov, A.P., Shmelev, I.P., Demidov, A.M., Efimov, B.V., Shubko, V.M., *Biology bulletin,* July-Aug. 1996, 23(4), p.387-390, Translated from Rossiĭskaia akademiia nauk. Izvestiia. Seriia biologicheskaia. 10 refs.

Marine biology, Oceanographic surveys, Subpolar regions, Radioactivity, Isotope analysis, Radioactive wastes, Submarines, Bottom sediment, Sampling, Ecosystems, Environmental impact, Environmental tests, Norwegian Sea

51-2319

Glaciological and microbiological description of the ice core in central Antarctica.

Abyzov, S.S., et al, *Biology bulletin,* Sep.-Oct. 1996, 22(5), p.441-446, Translated from Rossiĭskaia akademiia nauk. Izvestiia. Seriia biologicheskaia. 26 refs.

Pleistocene, Paleoecology, Ice sheets, Ice cores, Sampling, Microbiology, Ice composition, Ice dating, Biomass, Antarctica—Vostok Station

The search for microorganisms in anabiosis at a constant temperature below zero is of great interest. Nevertheless, the ice core in central Antarctica has been neglected by microbiologists. Here are presented the results of a complex glaciological and microbiological investigation of the ice core in the region of Vostok Station. (Auth. mod.)

51-2320

Defining mesoscale convective systems by their 85-GHz ice-scattering signatures.

Mohr, K.I., Zipser, E.J., *American Meteorological Society. Bulletin,* June 1996, 77(6), p.1179-1189, 25 refs.

Climatology, Radiometry, Spaceborne photography, Convection, Synoptic meteorology, Cloud physics, Ice crystal optics, Light scattering, Spectra, Brightness, Statistical analysis, Weather forecasting, Correlation

51-2321

"New" community of foraminifers *Hormosina globulifera* and *Rhabdaminna absyssorum* in the benthos fauna of the Barents Sea.

Kuznetsov, A.P., *Biology bulletin,* Jan.-Feb. 1996, 23(1), p.60-65, Translated from Rossiĭskaia akademiia nauk. Izvestiia. Seriia biologicheskaia. 22 refs.

Marine biology, Subpolar regions, Ecosystems, Ocean bottom, Biomass, Suspended sediments, Nutrient cycle, Distribution, Classifications, Sampling, Statistical analysis, Barents Sea

51-2322

Ice and snow accretion on structures.

Poots, G., Applied and engineering mathematics series, Taunton, England, Research Studies Press Ltd., 1996, 338p., Refs. p.320-331.

DLC QC926.32.P66 1996

Power line icing, Ice accretion, Ice loads, Snow loads, Wind pressure, Glaze, Ice storms, Wet snow, Mathematical models

51-2323

Matter and methods at low temperatures.

Pobell, F., Berlin, Springer-Verlag, 1996, 371p., Refs. p.333-356. 2nd edition with additional references and supplementary problems. For 1st edition see 47-3147.

DLC QC192.P63 1996

Low temperature research, Cryogenics, Phase transformations, Temperature measurement, Mathematical models

51-2324

Moving loads on ice plates.

Squire, V.A., Hosking, R.J., Kerr, A.D., Langhorne, P.J., Solid mechanics and its applications, Vol.45, Dordrecht, Netherlands, Kluwer Academic Publishers, 1996, 230p., Refs. p.213-222.

DLC TA714.5.M68 1996

Ice cover strength, Ice solid interface, Ice water interface, Ice elasticity, Ice deformation, Ice loads, Dynamic loads, Ice roads, Ice runways, Mathematical models

The effects of moving loads from vehicles and aircraft on floating sheets of sea or freshwater ice, are discussed. Most of the discussion is theoretical and mathematical, but field experiments and practical applications in both the Arctic and Antarctic are also included, with those in the Antarctic particularly concerned with aircraft landing and traveling on sea ice.

51-2325

Last glaciation of Vestfold Hills: extension of the East Antarctic ice sheet or lateral expansion of Sørsdal Glacier?

Gore, D.B., ed, *Polar record,* Jan. 1997, 33(184), p.5-12, Refs. p.11-12.

Glaciation, Glacier flow, Flow rate, Ice sheets, Glacial geology, Ice models, Moraines, Antarctica—Vestfold Hills, Antarctica—Sørsdal Glacier

Opinions are divided as to whether the area of Vestfold Hills was formerly covered by the East Antarctic ice sheet or Sørsdal Glacier. Striae orientations have been used to erect the model of extension of the ice sheet followed by a minor lateral expansion of Sørsdal Glacier, while basal till fabrics; distribution of weathered rock; and the nature, orientation, and distribution of moraines have been used to conclude that lateral expansion of Sørsdal Glacier alone can explain the evidence of the last glaciation of Vestfold Hills. A review of all available data supports the model of regional glaciation by an extended East Antarctic ice sheet. Lateral expansion of Sørsdal Glacier has probably only played a minor role in the glaciation of Vestfold Hills since the regional glaciation. (Auth.)

51-2326

John Biscoe's meteorological and oceanographic observations in the Southern Ocean, 1830-1832.

Rubin, M.J., *Polar record,* Jan. 1997, 33(184), p.39-46, 18 refs.

Weather observations, Meteorological data, Sea ice distribution, Expeditions, History

John Biscoe's voyage of discovery in the ships *Tula* and *Lively,* undertaken at the directive of the owners of the firm Messrs Enderby between 1830 and 1833, was the third expedition to circumnavigate Antarctica at a high latitude. This paper presents a digest and assessment of meteorological and oceanographic data recorded by Biscoe on that voyage. These observations, which are not normally easily accessible, substantiate the reputation of Biscoe as an assiduous and careful observer, and, when compared, they expand on the observations made during earlier circumnavigations by James Cook (1772-1775) and Thaddeus Bellingshausen (1819-1821). (Auth.)

51-2327

Towards a model for cometary nuclei for engineering studies for future space missions to comets.

Klinger, J., Levasseur-Regourd, A.C., Bouziani, N., Enzian, A., *Planetary and space science,* July 1996, 44(7), p.637-653, Refs. p.650-653.

Extraterrestrial ice, Geochemistry, Porous materials, Surface temperature, Temperature variations, Phase transformations, Ice vapor interface, Turbulent diffusion, Ice sublimation, Ice structure, Dust, Models, Classifications

51-2328

Models of the structure and evolution of comet P/Wirtanen.

Podolak, M., Prialnik, D., *Planetary and space science,* July 1996, 44(7), p.655-664, 25 refs.

Extraterrestrial ice, Porous materials, Ice sublimation, Ice structure, Stratification, Permeability, Ice vapor interface, Turbulent diffusion, Dust, Amorphous ice, Mathematical models

51-2329

Modeling the thermal properties and the gas flux from a porous, ice-dust body in the orbit of P/Wirtanen.

Benkhoff, J., Boice, D.C., *Planetary and space science,* July 1996, 44(7), p.665-673, 25 refs.

Extraterrestrial ice, Porous materials, Ice sublimation, Ice density, Surface temperature, Phase transformations, Mass transfer, Vapor transfer, Turbulent diffusion, Ice vapor interface, Dust, Mathematical models, Thermal analysis

51-2330

Thermal properties of cometary ices and sublimation residue including organics.

Kömle, N.I., Kargl, G., Thiel, K., Seiferlin, K., *Planetary and space science,* July 1996, 44(7), p.675-689, 33 refs.

Extraterrestrial ice, Simulation, Hydrogeology, Porous materials, Ice sublimation, Phase transformations, Hydrocarbons, Organic nuclei, Heating, Thermal properties, Thermal conductivity

51-2331

Line heat-source measurements of the thermal conductivity of porous H_2O ice, CO_2 ice and mineral powders under space conditions.

Seiferlin, K., Kömle, N.I., Kargl, G., Spohn, T., *Planetary and space science,* July 1996, 44(7), p.691-704, 44 refs.

Extraterrestrial ice, Regolith, Simulation, Porous materials, Aggregates, Ice thermal properties, Thermal conductivity, Mineralogy, Ice sublimation, Mass transfer, Ice water interface, Phase transformations

51-2332

Interior of a cometary nucleus.

Hughes, D.W., *Planetary and space science,* July 1996, 44(7), p.705-710, 25 refs.

Extraterrestrial ice, Simulation, Snow physics, Theories, Porous materials, Ice composition, Ice density, Ice strength, Fractals, Models, Correlation

51-2333

Mechanism for forming deep cracks in comets.

Jenniskens, P., Blake, D.F., *Planetary and space science,* July 1996, 44(7), p.711-713, 35 refs.

Extraterrestrial ice, Ice mechanics, Amorphous ice, Cracking (fracturing), Crack propagation, Phase transformations, Ice sublimation, Density (mass/volume), Thermal expansion, Simulation

51-2334

Impacts of the Great Lakes on regional climate conditions.

Scott, R.W., Huff, F.A., *Journal of Great Lakes research,* 1996, 22(4), p.845-863, 45 refs.

Climatology, Limnology, Atmospheric boundary layer, Lake effects, Cloud cover, Air water interactions, Weather observations, Weather forecasting, Snowfall, Precipitation (meteorology), Wind factors, Seasonal variations, Statistical analysis, Great Lakes

51-2335

Weather modification—a theoretician's viewpoint.

Young, K.C., *American Meteorological Society. Bulletin,* Nov. 1996, 77(11), p.2701-2710, 34 refs.

Climatology, Precipitation (meteorology), Weather modification, Cloud seeding, Cloud physics, Ice formation, Ice nuclei, Artificial nucleation, Heterogeneous nucleation, Hailstone growth, Hail prevention, Theories, Forecasting

51-2336

Detection of ice hydrometeor alignment using an airborne W-band polarimetric radar.

Galloway, J., et al, *Journal of atmospheric and oceanic technology,* Feb. 1997, 14(1), p.3-12, 17 refs.

Precipitation (meteorology), Climatology, Cloud physics, Snowstorms, Ice crystal optics, Orientation, Airborne radar, Radar echoes, Ice detection, Polarization (waves), Ice melting, Spectra, Correlation

51-2337

Storm-associated microwave radiometric signatures in the frequency range of 90-220 GHz.

Wang, J.R., Zhan, J., Racette, P., *Journal of atmospheric and oceanic technology,* Feb. 1997, 14(1), p.13-31, 39 refs.

Precipitation (meteorology), Cloud physics, Aerial surveys, Radiometry, Storms, Water vapor, Ice crystal optics, Brightness, Ice detection, Water content, Weather forecasting, Correlation

51-2338

Radiosonde temperature measurements in strong inversions: correction for thermal lag based on an experiment at the South Pole.

Mahesh, A., Walden, V.P., Warren, S.G., *Journal of atmospheric and oceanic technology,* Feb. 1997, 14(1), p.45-53, 24 refs.

Climatology, Air temperature, Atmospheric boundary layer, Polar atmospheres, Temperature inversions, Temperature measurement, Thermistors, Radio echo soundings, Accuracy, Correlation, Radiation balance, Antarctica—Amundsen-Scott Station

Very steep shallow temperature inversions occur during most of the year in the near-surface layer on the Antarctic Plateau. A radiosonde carried by a balloon rising at a few meters per second does not measure such inversions accurately because the response time of the thermistor is several seconds. To quantify this error, the authors flew a radiosonde on a tethered kite on several occasions in winter at Amundsen-Scott Station immediately prior to the routine launch of the same sonde on a weather balloon. In all cases, the equilibrated temperatures measured by the tethered sonde at a given pressure level were higher than those from the balloon-borne sonde throughout most of the inversion layer. Assuming that the tethered sonde data represent the true atmospheric temperature profile, a procedure can be developed to correct the temperature data from routine radiosonde soundings for the finite response time of the thermistor. The authors devise an accurate deconvolution method to retrieve the true atmospheric temperature profile from the radiosonde data when the thermistor response time is known. A correction for thermal lag is recommended for all situations where radiosondes are used to measure steep temperature gradients in the boundary layer: in polar regions throughout the year, at mid-latitude continental stations in winter, and at the tops of subtropical marine stratocumulus clouds. (Auth. mod.)

51-2339

Measurement of condensed water content in liquid and ice clouds using an airborne counterflow virtual impactor.

Twohy, C.H., Schanot, A.J., Cooper, W.A., *Journal of atmospheric and oceanic technology,* Feb. 1997, 14(1), p.197-202, 19 refs.

Climatology, Cloud physics, Aerial surveys, Water vapor, Water content, Ice water interface, Ice composition, Sampling, Probes, Hygrometers, Correlation, Accuracy

51-2340

Giant lake lurks beneath Antarctica's ice.

Muir, H., *New scientist,* June 22, 1996, 150(2035), p.16.

Glacial hydrology, Lake ice, Meltwater, Subglacial drainage, Geomorphology, Subsurface structures, Antarctica—Vostok Station

Hidden deep beneath the antarctic ice is a lake the size of Northern Ireland. The lake, which is cut off from the world above by a 4 km layer of ice, is likely to harbor unique life forms that have adapted to subzero temperatures and crushing pressures. Called Lake Vostok, the lake lies beneath Russia's Vostok ice-drilling station, and is one of 77 lakes known to lie under the antarctic ice sheet. It came to light during radio-echo experiments in the 1970s. But until now, no one knew the lake's size. Ellis-Evans hopes that it will eventually be possible to retrieve healthy microorganisms from the lake bed without contaminating their ancient environment. (Auth. mod.)

51-2341

Stick-slip statistical mechanics at the bed of a glacier.

Bahr, D.B., Rundle, J.B., *Geophysical research letters,* Aug. 1, 1996, 23(16), p.2073-2076, 16 refs.

Glacial geology, Ice mechanics, Glacier beds, Glacier flow, Basal sliding, Velocity, Bedrock, Ice solid interface, Water pressure, Mathematical models, Statistical analysis

51-2342

Environmental records of carbonaceous fly-ash particles from fossil-fuel combustion—a summary.

Wik, M., Renberg, I., *Journal of paleolimnology,* May 1996, 15(3), p.193-206, Refs. p.204-206.

Air pollution, Aerosols, Particles, Hydrocarbons, Carbon black, Lacustrine deposits, Snow impurities, Snow composition, Sampling

51-2343

Trace-element and stable-isotope geochemistry of non-marine ostracod shells in Quaternary palaeoenvironmental reconstruction.

Holmes, J.A., *Journal of paleolimnology,* May 1996, 15(3), p.223-235, Refs. p.233-235.

Limnology, Paleoecology, Paleoclimatology, Lacustrine deposits, Quaternary deposits, Geochemistry, Isotope analysis, Sampling, Microanalysis, Geochronology, Radioactive age determination

51-2344

Environmental history of a mountain lake (Lago Paione Superiore, central Alps, Italy) for the last ca. 100 years: a multidisciplinary, palaeolimnological study.

Guilizzoni, P., et al, *Journal of paleolimnology,* May 1996, 15(3), p.245-264, Refs. p.262-264.

Limnology, Alpine landscapes, Lacustrine deposits, Paleoecology, Classifications, Impurities, Geochemistry, Air pollution, Drill core analysis, Stratigraphy, Correlation, Italy—Lago Paione Superiore

51-2345

New hammer-driven freeze corer.

Miskimmin, B.M., Curtis, P.J., Schindler, D.W., Lafaut, N., *Journal of paleolimnology,* May 1996, 15(3), p.265-269, 11 refs.

Core samplers, Limnology, Icebound lakes, Soil freezing, Lacustrine deposits, Performance, Subglacial observations, Design, Mechanical properties

51-2346

Kråkenes Late-glacial palaeoenvironmental project.

Birks, H.H., et al, *Journal of paleolimnology,* May 1996, 15(3), p.281-286, 12 refs.

Research projects, Subarctic landscapes, Paleoclimatology, Limnology, Lacustrine deposits, Glacial geology, Cirque glaciers, Glacier oscillation, Paleoecology, Radioactive age determination, Geochronology, International cooperation, Norway—Kråkenes

51-2347

Technogenic disturbance of pretundra forest in Noril'sk Valley.

Kharuk, V.I., Winterberger, K., Tsibul'skiĭ, G.M., IAkhimovich, A.P., Moroz, S.N., *Russian journal of ecology,* Nov.-Dec. 1996, 27(6), p.406-410, Translated from Ekologiia. 15 refs.

Forest ecosystems, Plant ecology, Degradation, Forest lines, Air pollution, Aerosols, Soil air interface, Environmental impact, Tundra vegetation, Environmental tests, Sampling, Russia—Noril'sk

51-2348

Policy makers' challenge—radioactive dumping in the Arctic Ocean.

Lamb, J., Gizewski, P., *Oceanus,* 1993, 36(3), p.89-91.

Oceanography, Water pollution, Radioactive wastes, Waste disposal, Environmental impact, Environmental protection, Legislation, International cooperation, Arctic Ocean

51-2349

Influence of changing atmospheric circulation on precipitation $\delta^{18}O$-temperature relations in Canada during the Holocene.

Edwards, T.W.D., Wolfe, B.B., MacDonald, G.M., *Quaternary research,* Nov. 1996, 46(3), p.211-218, Refs. p.217-218.

Paleoclimatology, Paleoecology, Air masses, Precipitation (meteorology), Air temperature, Oxygen isotopes, Quaternary deposits, Isotope analysis, Correlation, Landscape development, Canada

51-2350

Stable isotope and lithologic evidence of Late-glacial and Holocene oceanography of the northwestern Pacific and its marginal seas.

Gorbarenko, S.A., *Quaternary research,* Nov. 1996, 46(3), p.230-250, Refs. p.249-250.

Oceanography, Pleistocene, Paleoecology, Ocean currents, Subpolar regions, Marine deposits, Ice rafting, Plankton, Quaternary deposits, Drill core analysis, Lithology, Isotope analysis, Radioactive age determination, Bering Sea, Okhotsk Sea

51-2351

Palynological and radiocarbon evidence for deglaciation events in the Green Bay Lobe, Wisconsin.

Maher, L.J., Jr., Mickelson, D.M., *Quaternary research,* Nov. 1996, 46(3), p.251-259, 35 refs.

Pleistocene, Quaternary deposits, Glacial geology, Glacier oscillation, Glacial deposits, Sedimentation, Palynology, Radioactive age determination, Lithology, Stratigraphy, United States—Wisconsin

51-2352

Implications of stratigraphic and paleoclimatic records of the last interglaciation from the Nordic Seas.

Bauch, H.A., Erlenkeuser, H., Grootes, P.M., Jouzel, J., *Quaternary research,* Nov. 1996, 46(3), p.260-269, Refs. p.268-269.

Oceanography, Glacier oscillation, Marine deposits, Paleoclimatology, Quaternary deposits, Ice cores, Stratigraphy, Drill core analysis, Oxygen isotopes, Isotope analysis, Radioactive age determination, Correlation, Greenland, Iceland Sea

51-2353

Thermal, pressure and wind fields at ground level in the area of the Italian base at Terra Nova Bay, Victoria Land, Antarctica, as observed by a network of automatic weather stations.

Cogliani, E., Abbate, G., Racalbuto, S., *Annales geophysicae,* Oct. 1996, 14(10), p.1088-1094, 17 refs.

Weather stations, Weather observations, Wind velocity, Meteorological data, Ice sheets, Glaciers, Antarctica—Terra Nova Bay

Ground temperature, pressure and wind speed monthly averages, calculated from data collected by 9 automatic weather stations in the Terra Nova Bay area during 1987-1991, are presented. From Feb. to Mar., a rapid drop in temperature is observed at all stations. A strong thermal gradient develops during Feb.-Apr. and Oct.-Dec. between the coastal region and inner highlands. The baric configuration follows the elevation of the area. Annual average pressure and temperature as functions of station altitude show linear trends. Severe katabatic wind episodes are recorded at all stations, with wind speed exceeding 25 m/s and direction following the orographic features of the inner areas. Co-occurrences of these episodes were observed for stations located along stream lines of cold air drainage. The autocorrelation function of maximum wind speed time series shows wind persistence of 2-3 days and wind periodicity of about one week. (Auth. mod.)

51-2354

Halocarbons in antarctic surface waters and snow.

Zoccolillo, L., Amendola, L., Tarallo, G.A., *International journal of environmental analytical chemistry,* 1996, Vol.63, p.91-98, 10 refs.

Snow impurities, Snow composition, Water chemistry, Limnology, Ice composition, Antarctica—Terra Nova Bay

Surface and pit snow samples, collected from Terra Nova Bay area during the Italian expeditions of 1991-92 and 1992-93, were analyzed for halocarbons: tetrachloromethane, trichloroethylene and tetrachloroethylene. The results obtained (including those related to lake and ice water samples previously reported) were evaluated with respect to the worldwide distribution of these compounds and their diffusion on a global scale. Important innovations, concerning sensitivity and reproducibility of the analytical method, are also reported. (Auth.)

51-2355

Occurrence of oxygenated volatile organic compounds (VOC) in Antarctica.

Ciccioli, P., Cecinato, A., Brancaleoni, E., Frattoni, M., *International journal of environmental analytical chemistry,* 1996, Vol.62, p.245-253, 15 refs.

Atmospheric composition, Impurities, Antarctica—Terra Nova Bay

Polar and non-polar VOC present in six different sites located near Terra Nova Bay were determined by HRCG-MS; 76 different components were positively identified. Among them, particularly important are oxygenated components (free acids, aldehydes, ketones, alcohols, esters, ethers and furanes) as they account for the largest portion of the organic fraction. Biogenic emission seem to be the major source for many of them. This would explain their ubiquitous occurrence in the troposphere. (Auth.)

51-2356

Rapid sea-level rise soon from west antarctic ice sheet collapse?

Bentley, C.R., *Science,* Feb. 21, 1997, 275(5303), p.1077-1078, 22 refs.

Ice sheets, Mass balance, Ice shelves, Climatic changes, Antarctica—West Antarctica, Antarctica—Ross Ice Shelf

The author suggests and analyzes several conditions which could cause an imminent collapse of the ice sheet atop West Antarctica. In the end he shows that many of the necessary conditions are already in operation but that the system is not significantly out of mass balance. He concludes that the chances of a natural collapse of the west antarctic ice sheet, based on the concept of a randomly timed collapse on the average of once every 100,000 years, are on the order of 0.1%.

51-2357

Review of polar climate evolution during the Neogene, based on the marine sediment record.

Kennett, J.P., Paleoclimate and evolution, with emphasis on human origins, edited by E.S. Vrba, G.H. Denton, T.C. Partridge, and L.H. Burckle, New Haven, CT, Yale University Press, 1995, p.49-64, Refs. p.60-64.

DLC GN281.4.P35 1995

Ice sheets, Ice formation, Paleoclimatology, Antarctica—East Antarctica

The climate of Antarctica and the southern ocean since the Middle Eocene (ca. 50 myr) has experienced generally progressive and sequential decreases in temperature and increases in ice accumulation. Reversals of this cooling trend were unusual. The most distinct warming occurred during the Late Paleogene through the Early Neogene. No major climatic reversals in antarctic cooling occurred after the early Middle Miocene (ca. 15 myr). The development of the polar cryosphere caused fundamental changes in global oceanic and atmospheric circulation, leading in stepwise fashion to widespread aridity in middle- to low-latitude regions. Details of these developments are recounted as they progressed from Early Miocene through the Late Pliocene epochs in the antarctic polar regions. The lack of symmetry in the development of global climatic change in the Arctic regions until the Late Pliocene, is noted. (Auth. mod.)

51-2358

Problem of Pliocene paleoclimate and ice-sheet evolution in Antarctica.

Denton, G.H., Paleoclimate and evolution, with emphasis on human origins, edited by E.S. Vrba, G.H. Denton, T.C. Partridge, and L.H. Burckle, New Haven, CT, Yale University Press, 1995, p.213-229, 84 refs.

DLC GN281.4.P35 1995

Paleoclimatology, Ice sheets, Climatic changes, Variations

There are two contrasting views concerning the Pliocene stability of the east antarctic ice sheet and coeval Pliocene paleoclimate. Because both hypotheses stand at the present time, the antarctic paleoclimatic record and ice-sheet history cannot yet contribute to the interlocked questions of paleoclimate and evolution. Antarctic ice sheet history is intertwined with the overall problems of rifting and landscape evolution in the Ross Embayment. Consequently, the Pliocene history of the antarctic ice sheet cannot be understood in isolation from the problems of the development of the west antarctic rift system and the shoulder of this rift system formed by the Transantarctic Mountains. The timing and rates of uplift and basin development are not well known, but they are important in interpreting glacial deposits in terms of ice sheet history. Different structural blocks could have had varying glacial and tectonic histories. Finally, it is not yet possible to relate terrestrial glacial sequences in the Transantarctic Mountains with offshore sedimentary sequences in the rift basins. A number of fundamental questions, must, therefore, be answered before the Pliocene glacial history of the Antarctic can be understood.

51-2359

Critical review of the micropaleontological evidence used to infer a major drawdown of the east antarctic ice sheet during the Early Pliocene.

Burckle, L.H., Paleoclimate and evolution, with emphasis on human origins, edited by E.S. Vrba, G.H. Denton, T.C. Partridge, and L.H. Burckle, New Haven, CT, Yale University Press, 1995, p.230-241, 54 refs.

DLC GN281.4.P35 1995

Geochemistry, Microbiology, Ice sheets, Ablation, Sea level

The author disputes the conclusions of an earlier researcher who claims that in Sirius Group samples, "the microfossil assemblages are dominated by Pliocene [diatom] species." The history of the antarctic cryosphere can be more fully and believably developed by study of deep-sea sediments recovered from the southern ocean and deep cores recovered from the antarctic continent. It is apparent that although there may have been drawdown of the east antarctic ice sheet during the early Pliocene, it was not of the magnitude envisioned by the deglacial hypothesis. In addition, it is very likely that the west antarctic ice sheet and alpine and tidewater glaciers from both hemispheres contributed to the accompanying sea-level rise. This has implications for Early Pliocene climate and paleogeography; a more limited sea-level rise during this time would be less restrictive of faunal and floral migrations across terrestrial choke points, such as the Suez region. Similarly, oceanic choke points such as the seas around the Indonesian archipelago would have been less affected by a more modest sea-level rise, and the Early Pliocene warming is seen as presenting less of a physical impediment to continental faunal and floral migration. (Auth. mod.)

51-2360

Potential vorticity and vertical velocity at the Iceland-Færœs Front.

Allen, J.T., Smeed, D.A., *Journal of physical oceanography,* Dec. 1996, 26(12), p.2611-2634, 47 refs.

Oceanographic surveys, Subpolar regions, Ocean currents, Water transport, Boundary layer, Velocity measurement, Hydrography, Upwelling, Stratigraphy, Atlantic Ocean

51-2361

Topographic-Rossby mode resonance over the Iceland-Faeroe Ridge.

Miller, A.J., Lermusiaux, P.F.J., Poulain, P.M., *Journal of physical oceanography,* Dec. 1996, 26(12), p.2735-2747, 25 refs.

Oceanography, Ocean currents, Boundary layer, Velocity measurement, Fluid dynamics, Air water interactions, Wind factors, Periodic variations, Spectra, Resonance, Topographic effects, Correlation, Atlantic Ocean

51-2362

Study of air and road-surface temperature variations during clear wind nights.

Gustavsson, T., *International journal of climatology,* Aug. 1995, 15(8), p.919-932, 37 refs.

Air temperature, Surface temperature, Temperature measurement, Temperature variations, Frost forecasting, Topographic effects, Wind factors, Cooling rate, Radiant cooling, Forest strips, Windbreaks

51-2363

Dielectric properties and annealing effects of as-grown KOH-highly doped ice single crystals.

Kawada, S., Tutiya, R., *Journal of physics and chemistry of solids,* Jan. 1997, 58(1), p.115-121, 7 refs.

Ice physics, Doped ice, Ice crystal growth, Ice crystal structure, Ice dielectrics, Dielectric properties, Dispersions, Spectra, Phase transformations, Defects, Simulation, Electrical measurement, Temperature effects, Ice crystal growth, Ice crystal structure

51-2364

Anisotropic growth kinetics of ice crystals from water studied by molecular dynamics simulation.

Nada, H., Furukawa, Y., *Journal of crystal growth,* Dec. 1996, 169(3), p.587-597, 27 refs.

Ice physics, Ice water interface, Surface structure, Ice crystal growth, Ice mechanics, Molecular structure, Anisotropy, Molecular energy levels, Ice models, Computerized simulation

51-2365

Thermodynamics of the curvature effect on ice surface tension and nucleation theory.

Bogdan, A., *Journal of chemical physics,* Feb. 1, 1997, 106(5), p.1921-1929, 44 refs.

Ice physics, Ice water interface, Ice vapor interface, Adsorption, Interfacial tension, Supercooling, Ice crystal structure, Ice crystal nuclei, Homogeneous nucleation, Ice models, Thermodynamics, Molecular energy levels

51-2366

Engineering parameters in the design of evapotranspiration beds.

Frank, W.L., *WATER/Engineering & management,* Nov. 1996, 143(11), p.31-33,37, 13 refs.

Municipal engineering, Sewage disposal, Water treatment, Design, Evapotranspiration, Snow hydrology, Meltwater, Surface drainage, Runoff, Seepage, Cold weather performance

51-2367

Predicting freeze-thaw durability of concrete—a new approach.

Attiogbe, E.K., *ACI materials journal,* Sep.-Oct. 1996, 93(5), p.457-464, 15 refs.

Concrete admixtures, Concrete durability, Concrete strength, Freeze thaw cycles, Frost resistance, Standards, Air entrainment, Mechanical properties, Forecasting, Classifications, Cold weather performance

51-2368

Galileo's first look at Ganymede and Europa.

Anderson, C.M., *Planetary report,* Nov.-Dec. 1996, 16(6), p.12-15.

Extraterrestrial ice, Satellites (natural), Ground ice, Regolith, Surface structure, Spacecraft, Spaceborne photography, Exploration, Europa, Ganymede

51-2369

Underwater ultraviolet radiation: development of spectral models for northern high latitude lakes.

Laurion, I., Vincent, W.F., Lean, D.R.S., *Photochemistry and photobiology,* Jan. 1997, 65(1), p.107-114, 31 refs.

Limnology, Ecosystems, Tundra terrain, Insolation, Ultraviolet radiation, Photochemical reactions, Radiation absorption, Lake water, Transparence, Light transmission, Attenuation, Photometry, Environmental tests, Models

51-2370

Luminescence from UV-irradiated amorphous H_2O ice.

Quickenden, T.I., Green, T.A., Lennon, D., *Journal of physical chemistry,* Oct. 17, 1996, 100(17), p.16801-16807, 42 refs.

Ice physics, Amorphous ice, Ultraviolet radiation, Luminescence, Periodic variations, Spectra

51-2371

Remote sensing of oil spills near the Kolva River, Russia.

Chadwick, D.J., Bolus, R.L., McKim, H.L., Link, L.E., MP 3952, 1995, 15p., 5 refs. Unpublished paper presented at the 2nd International Oil Spill Research and Development Forum, Fostering International Co-operative Research, May 23-26, 1995, London, England.

Remote sensing, Oil spills, Pipelines, Crude oil, Cold weather operation, Spectra, Accuracy, Water pollution, Wetlands, Spacecraft, Synthetic aperture radar, Russia—Kolva River, Russia—Komi

51-2372

Guide to navigating through the Northern Sea Route.

Maliavko, M.G., ed, Russia. Ministry of Transport. State Hydrographic Department. Administration of the Northern Sea Route, No.4151B, St. Petersburg, Department of Navigation and Oceanography, Ministry of Defense, Russian Federation, 1996, 384p.

Marine transportation, Ice navigation, Icebreakers, Cold weather performance, Marine meteorology, Hydrology, Sea ice, Ice conditions, Manuals, Route surveys, Northern Sea Route, Russia—Kara Sea, Russia—Laptev Sea, Russia—East Siberian Sea, Chukchi Sea, Bering Strait

51-2373

Effect of galactic cosmic rays on the formation of the spring maximum in the total ozone content in the polar and subpolar regions.

Osechkin, V.V., Gnilovskoĭ, E.V., Kondratovich, K.V., *USSR Academy of Sciences. Transactions. Earth science sections,* Apr. 1989(Pub. Sep. 90), 305(2), p.18-20, Translated from Akademiia nauk SSSR. Doklady. Vol.305, No.4, p.825-828. 9 refs.

DLC QE1.A25183

Ozone, Radiation, Geomagnetism, Stratosphere, Atmospheric composition, Antarctica

The difficulties in explaining the spring ozone maximum may be successfully overcome if, in addition to the photochemistry, the effect of galactic cosmic ray particles (primarily protons) on the ozonosphere is included, and the structural characteristics of the Earth's magnetic field are taken into account. The authors propose the following mechanism: there is no ozone-forming insolation during the long polar night; the ozone in the lower polar stratosphere has a lifetime of between 100 and 500 days, depending on altitude. With such a long lifetime the ozone content of the polar stratosphere should remain constant from fall to spring. In actual fact, the total ozone content is observed to increase from fall to spring. This means that there must be a non-photochemical source of ozone in the polar stratosphere. It is suggested that radiolysis of molecular oxygen by galactic cosmic-ray protons is the only source generating ozone during the polar night. The mechanism is not inconsistent with the local ozone minimum observed over the central Antarctic in spring, 1983. (Auth. mod.)

51-2374

Ice stress measurements from land-fast ice along Canada's Labrador coast.

Prinsenberg, S.J., Fowler, G.A., van der Baaren, A., Beanlands, B., *Cold regions science and engineering,* Jan. 1997, 25(1), p.1-15, 13 refs.

Sea ice, Fast ice, Ice pressure, Ice air interface, Wind factors, Mechanical tests, Stresses, Sensors, Electrical logging, Statistical analysis, Canada—Labrador

51-2375

Processing snow for high strength roads and runways.

Lang, R.M., Blaisdell, G.L., D'Urso, C., Reinemer, G., Lesher, M., MP 3953, *Cold regions science and engineering,* Jan. 1997, 25(1), p.17-31, 21 refs.

Snow (construction material), Mechanical tests, Snow roads, Ice runways, Machinery, Snow compaction, Snow hardness, Bearing strength, Density (mass/volume), Hardness tests, Imaging, Compressive properties

Using a variety of conventional snow processing equipment in deep snow fields in West Yellowstone, MT, the authors studied snow processing techniques having the potential for producing high-strength snow roads and runways. The test location and timing were selected to simulate conditions in polar regions. Four separate test sites, each with a different treatment, were established using the snow processing equipment. Observations were made for 12 weeks after construction to monitor the snow's hardness (strength) and its temperature distribution. Plane sections were taken at each site on a weekly basis to allow comparison of bond density and strength. Image analysis was used to find which critical microstructural properties correlate best with compressive strength changes. Test results indicate that a powered tiller with a relatively dense tooth population provided the highest strength snow. This snow was strong enough to easily support contact loads greater than 700 kPa, which could allow the use of conventional aircraft and wheeled vehicles in areas of deep snow.

51-2376

Moisture migration during freeze and thaw of unsaturated soils: modeling and large scale experiments.

Shoop, S.A., Bigl, S.R., MP 3954, *Cold regions science and engineering,* Jan. 1997, 25(1), p.33-45, 19 refs.

Geocryology, Frozen ground thermodynamics, Soil water migration, Moisture transfer, Frost heave, Frost penetration, Unfrozen water content, Freeze thaw tests, Ice water interface, Interfacial tension, Simulation, Phase transformations, Mathematical models, Forecasting

A coupled heat flow and moisture flow model (FROSTB) was used to simulate large-scale freeze-thaw experiments to assess its ability to predict soil moisture conditions. The experimental data consist of temperature and soil moisture profiles measured during freeze-thaw cycles in a 1 m layer of frost-susceptible silty sand over roughly 2 m of gravelly sand. Two experimental conditions were modeled: (1) where the soil was fairly wet and the water table was shallow (1 m below surface), and (2) where the soil moisture was lower than specific retention and the water table was deep. Overall, the model predicts the frost penetration and heave quite well; however, it tends to overpredict ice formation. The authors propose improvements through using a "pseudo" three-phase flow potential and calculating

volumetric segregated ice content starting at 90% of saturation. The effects of changing the constants related to hydrologic properties are also discussed.

51-2377

Application of capacitance instrumentation to the measurement of density and velocity of flowing snow.

Louge, M.Y., Steiner, R., Keast, S.C., Decker, R., Dent, J., Schneebeli, M., *Cold regions science and engineering*, Jan. 1997, 25(1), p.47-63, 20 refs.

Avalanche mechanics, Avalanche triggering, Snow cover stability, Rheology, Snow mechanics, Probes, Electronic equipment, Snow density, Velocity measurement, Electrical measurement, Dielectric properties, Electrical resistivity, Design, Simulation

51-2378

Analysis of the shapes of sea ice ridges.

Timco, G.W., Burden, R.P., *Cold regions science and engineering*, Jan. 1997, 25(1), p.65-77, 33 refs.

Sea ice, Pressure ridges, Surface properties, Physical properties, Topographic features, Profiles, Ice cover thickness, Ice bottom surface, Statistical analysis, Correlation

51-2379

Microwave response to stress in sea ice—a report on initial field tests.

Coon, M.D., Onstott, R.G., Echert, D.C., *Cold regions science and engineering*, Jan. 1997, 25(1), p.79-83, 9 refs.

Sea ice, Remote sensing, Ice surveys, Simulation, Mechanical properties, Stress concentration, Ice deformation, Crack propagation, Spaceborne photography, Radar echoes, Backscattering, Ice cover effect

51-2380

Computer analysis of the dynamics of pulsating glaciers.

Garelik, I.S., Kotliakov, V.M., Osipova, G.B., Tsvetkov, D.G., *Mapping sciences and remote sensing*, July-Sep. 1996, 33(3), p.207-216, Translated from Rossiĭskaia akademiia nauk. Izvestiia. Seriia geograficheskaia. 6 refs.

Mountain glaciers, Remote sensing, Glacier flow, Mountain glaciers, Glacial hydrology, Sliding, Glacier surveys, Photogrammetric surveys, Profiles, Mapping, Altitude, Spaceborne photography, Image processing, Computer applications, Computer programs

51-2381

Physical and geochemical analysis of a late glacial/Little Ice Age pedostratigraphic complex in the Zillertal Alps, Austria.

Mahaney, W.C., Sanmugadas, K., Hancock, R.G.V., *Zeitschrift für Geomorphologie*, Dec. 1996, 40(4), p.447-460, With German and French summaries. 39 refs.

Pleistocene, Quaternary deposits, Moraines, Glacial geology, Alpine landscapes, Soil formation, Soil profiles, Stratigraphy, Geochemistry, Sampling, Radioactive age determination, Geochronology, Austria—Alps

51-2382

Rock weathering rates in arctic and subarctic environments (Abisko Mts., Swedish Lappland).

André, M.F., *Zeitschrift für Geomorphologie*, Dec. 1996, 40(4), p.499-517, With German and French summaries. 60 refs.

Geomorphology, Glacial erosion, Arctic landscapes, Subarctic landscapes, Weathering, Bedrock, Substrates, Striations, Lithology, Rock properties, Geochemistry, Sweden—Abisko Mountains

51-2383

Major sediment pulse in a subalpine river caused by debris flows in Montana, USA.

Butler, D.R., Malanson, G.P., *Zeitschrift für Geomorphologie*, Dec. 1996, 40(4), p.525-535, With German and French summaries. 15 refs.

River basins, River flow, Geomorphology, Alpine landscapes, Sediment transport, Suspended sediments, Mass flow, Mass movements (geology), Thunderstorms, Snowmelt, Meteorological factors, Seasonal variations, United States—Montana

51-2384

Biochemistry of cryoprotectants.

Storey, K.B., Storey, J.M., Insects at low temperature. Edited by R.E. Lee, Jr. and D.L. Denlinger, New York, Chapman and Hall, 1991, p.64-93, Refs. p.89-93.

DLC QL599.82.I57

Cryobiology, Ecology, Physiological effects, Cold tolerance, Frost resistance, Solutions, Acclimatization, Antifreezes, Chemical properties, Chemical analysis

51-2385

Hemolymph proteins involved in insect subzero-temperature tolerance: ice nucleators and antifreeze proteins.

Duman, J.G., Xu, L., Neven, L.G., Tursman, D., Wu, D.W., Insects at low temperature. Edited by R.E. Lee, Jr. and D.L. Denlinger, New York, Chapman and Hall, 1991, p.94-127, Refs. p.123-127.

DLC QL599.82.I57

Cryobiology, Frost resistance, Solutions, Hydrocarbons, Antifreezes, Ice nuclei, Heterogeneous nucleation, Chemical analysis, Chemical properties, Supercooling, Freezing points, Temperature effects

51-2386

Snow algae of the Windmill Islands region, Antarctica.

Ling, H.U., *Hydrobiologia*, Oct. 25, 1996, 336(1-3), International Phycological Congress, 5th, Qingdao, China, June 1994. Proceedings. Workshop on Biogeography of Freshwater Algae, p.99-106, 26 refs.

Algae, Ecosystems, Littoral zone, Colored snow, Snow composition, Sampling, Scanning electron microscopy, Microstructure, Classifications, Microbiology, Antarctica—Windmill Islands

A list of the 24 species of snow algae identified from the Windmill Is., a resume of what is currently known about the major species, and avenues for further research are provided. New species discovered include 2 *Desmotetra* spp., 1 *Chlorosarcina* sp., 2 *Chloromonas* spp. and a *Palmellopsis* sp. Several of these are from genera whose members have previously been found only in the soil flora. Not only was it necessary to elucidate the life cycle of these species, but it was also essential to examine them ultrastructurally to determine their taxonomic positions. (Auth. mod.)

51-2387

Solving the energy dilemma at Seven Bridges Ice Arena.

Louria, D., *ASHRAE journal*, Aug. 1996, 38(8), p.67-70.

Buildings, Cooling systems, Refrigeration, Brines, Snowmelt, Meltwater, Latent heat, Ice air interface, Humidity, Cost analysis

51-2388

Potentiality of the ground-penetrating radar for the analysis of the stratigraphy and sedimentology of Mars.

Ori, G.G., Ogliani, F., *Planetary and space science*, Nov. 1996, 44(11), International Workshop on INTERMARSNET, Capri, Italy, Sep. 28-30, 1995. Selected papers, p.1303-1315, 19 refs.

Mars (planet), Subsurface investigations, Sounding, Radar echoes, Profiles, Stratigraphy, Ice detection, Extraterrestrial ice, Permafrost structure, Lithology, Ice water interface, Regolith, Simulation

51-2389

Channels and valleys on Mars: cold climate features formed as a result of a thickening cryosphere.

Carr, M.H., *Planetary and space science*, Nov. 1996, 44(11), International Workshop on INTERMARSNET, Capri, Italy, Sep. 28-30, 1995. Selected papers, p.1411-1423, 52 refs.

Mars (planet), Extraterrestrial ice, Ground ice, Regolith, Permafrost hydrology, Flooding, Channels (waterways), Surface drainage, Geomorphology, Climatic changes, Theories

51-2390

Beat the winter chill. *Construction equipment*, Jan. 1997, 95(1), p.13.

Cold weather construction, Cold weather performance, Engines, Filters, Batteries, Antifreezes, Winter maintenance, Protection

51-2391

Effect of the structure of frozen solutions of H_2SO_4 on radiothermoluminescence.

Lotnik, S.V., Khamidullina, L.A., Kazakov, V.P., *Russian chemical bulletin*, June 1996, 45(6), p.1495-1497, Translated from Akademiia nauk. Izvestiia. Seriia khimicheskaia. 8 refs.

Frozen liquids, Solutions, Radiation absorption, X ray analysis, Luminescence, Temperature effects, Phase transformations, Cracking (fracturing), Thermodynamics, Photochemical reactions, Laboratory techniques

51-2392

Anthropogenic radioactivity in the vicinity of the Bilibino Nuclear Power Station, Chukotka, Russia.

Cooper, L.W., Larsen, I.L., Franklin, G.L., Houser, G.F., Emelianova, L.G., Neretin, L.N., *Polar geography*, Jan.-Mar. 1996, 20(1), p.3-19, 10 refs.

Nuclear power, Subpolar regions, Radioactive wastes, Fallout, Aerosols, Soil pollution, Soil analysis, Plant tissues, Environmental impact, Environmental tests, Hydrogeochemistry, Permafrost bases, Permafrost beneath rivers, Sampling, Russia—Chukotskiy Peninsula

51-2393

Environment in the Russian Arctic: status report.

Vil'chek, G.E., Krasovaskaia, T.M., Tsiban, A.V., Cheliukanov, V.V., *Polar geography*, Jan.-Mar. 1996, 20(1), p.20-43, Refs. p.41-43.

Arctic landscapes, Subpolar regions, Tundra vegetation, Ecosystems, Ecology, Air pollution, Water pollution, Degradation, Environmental protection, Permafrost preservation, Monitors, Russia—Chukotskiy Peninsula, Russia—Franz Josef Land, Russia—Wrangel Island

51-2394

Permafrost-climatic monitoring of Russia: analysis of field data and forecast.

Pavlov, A.V., *Polar geography*, Jan.-Mar. 1996, 20(1), p.44-64, 29 refs.

Climatology, Global warming, Air temperature, Frozen ground temperature, Permafrost surveys, Permafrost transformation, Climatic factors, Soil air interface, Snow cover effect, Thaw depth, Forecasting, Russia

51-2395

Radionuclides in seas of the Western Arctic.

Matishov, G.G., Matishov, D.G., Pavlova, L.G., Rissanen, K., Szczepa, J., *Polar geography*, Jan.-Mar. 1996, 20(1), p.65-77, 17 refs.

Oceanography, Water pollution, Air pollution, Bottom sediment, Radioactive wastes, Radioactive isotopes, Radioactivity, Distribution, Environmental impact, Environmental tests, Ecosystems, Arctic Ocean

51-2396

Unit cells for the simulation of hexagonal ice.

Hayward, J.A., Reimers, J.R., *Journal of chemical physics*, Jan. 22, 1997, 106(4), p.1518-1529, 30 refs.

Ice physics, Ice structure, Molecular structure, Latticed structures, Hydrogen bonds, Orientation, Ice models, Simulation, Molecular energy levels, Statistical analysis

51-2397

Bearing capacity of floating ice covers subjected to static, moving, and oscillatory loads.

Kerr, A.D., *Applied mechanics reviews*, Nov. 1996, 49(11), p.463-476, 163 refs.

Floating ice, Ice cover strength, Ice mechanics, Flexural strength, Bearing strength, Dynamic loads, Static loads, Ice solid interface, Ice water interface, Mathematical models, Ice roads, Mechanical tests

51-2398

Combined use of three techniques for studying transport and dispersion in cumuli.

Stith, J., Scala, J., Reinking, R., Martner, B., *Journal of applied meteorology,* Sep. 1996, 35(9), World Meteorological Organization Scientific Conference on Weather Modification, 6th, Paestum, Italy, May-June, 1994. Selected papers, p.1387-1401, 11 refs.

Precipitation (meteorology), Weather modification, Cloud physics, Cloud seeding, Aerosols, Ice nuclei, Turbulent diffusion, Artificial nucleation, Silver iodide, Radar echoes, Ice formation, Simulation, Weather forecasting, Wind factors

51-2399

Feeder-cell ingestion of seeding aerosol from cloud base determined by tracking radar chaff.

Reinking, R.F., Martner, B.E., *Journal of applied meteorology,* Sep. 1996, 35(9), World Meteorological Organization Scientific Conference on Weather Modification, 6th, Paestum, Italy, May-June, 1994. Selected papers, p.1402-1415, 13 refs.

Precipitation (meteorology), Cloud seeding, Cloud physics, Thunderstorms, Weather modification, Simulation, Dispersions, Turbulent exchange, Convection, Aerosols, Ice nuclei, Artificial nucleation, Radar echoes

51-2400

Seeding convective clouds with ice nuclei or hygroscopic particles: a numerical study using a model with detailed microphysics.

Reisin, T., Tzivion, S., Levin, Z., *Journal of applied meteorology,* Sep. 1996, 35(9), World Meteorological Organization Scientific Conference on Weather Modification, 6th, Paestum, Italy, May-June, 1994. Selected papers, p.1416-1434, 44 refs.

Precipitation (meteorology), Weather modification, Cloud seeding, Ice nuclei, Hygroscopic nuclei, Cloud physics, Mass transfer, Dispersions, Heterogeneous nucleation, Performance, Simulation

51-2401

Effects of mountain lee waves on the transport of liquid propane-generated ice crystals.

Reynolds, D.W., *Journal of applied meteorology,* Sep. 1996, 35(9), World Meteorological Organization Scientific Conference on Weather Modification, 6th, Paestum, Italy, May-June, 1994. Selected papers, p.1435-1456, 24 refs.

Precipitation (meteorology), Cloud seeding, Cloud physics, Weather modification, Aerosols, Gravity waves, Liquefied gases, Artificial nucleation, Dispersions, Ice crystals, Simulation, Radio echo soundings, Wind factors

51-2402

Australian winter mountain storm clouds: precipitation augmentation potential.

Long, A.B., Carter, E.J., *Journal of applied meteorology,* Sep. 1996, 35(9), World Meteorological Organization Scientific Conference on Weather Modification, 6th, Paestum, Italy, May-June, 1994. Selected papers, p.1457-1464, 13 refs.

Precipitation (meteorology), Thunderstorms, Synoptic meteorology, Fronts (meteorology), Cloud physics, Weather modification, Cloud seeding, Supercooled clouds, Temperature variations, Moisture transfer, Vapor diffusion, Simulation

51-2403

Assessing the potential for rain augmentation—the Nelspruit randomized convective cloud seeding experiment.

Mather, G.K., Dixon, M.J., de Jager, J.M., *Journal of applied meteorology,* Sep. 1996, 35(9), World Meteorological Organization Scientific Conference on Weather Modification, 6th, Paestum, Italy, May-June, 1994. Selected papers, p.1465-1482, 35 refs.

Precipitation (meteorology), Cloud seeding, Cloud physics, Weather modification, Thunderstorms, Simulation, Radar echoes, Water content, Dry ice (trademark), Silver iodide, Heterogeneous nucleation, Performance, Statistical analysis

51-2404

Project Mountain Valley Sunrise—progress in science and technology.

Fukuta, N., *Journal of applied meteorology,* Sep. 1996, 35(9), World Meteorological Organization Scientific Conference on Weather Modification, 6th, Paestum, Italy, May-June, 1994. Selected papers, p.1483-1493, 19 refs.

Precipitation (meteorology), Cloud seeding, Weather modification, Supercooled fog, Smoke generators, Atmospheric boundary layer, Ice crystal growth, Homogeneous nucleation, Heterogeneous nucleation, Ice vapor interface, Carbon dioxide, Convection, Simulation

51-2405

Ice nuclei, rainwater chemical composition, and static cloud seeding effects in Israel.

Levi, Y., Rosenfeld, D., *Journal of applied meteorology,* Sep. 1996, 35(9), World Meteorological Organization Scientific Conference on Weather Modification, 6th, Paestum, Italy, May-June, 1994. Selected papers, p.1494-1501, 19 refs.

Precipitation (meteorology), Weather modification, Cloud physics, Synoptic meteorology, Cloud seeding, Condensation nuclei, Geochemistry, Ice nuclei, Artificial nucleation, Heterogeneous nucleation, Dust, Aerosols, Statistical analysis

51-2406

Seeding effectiveness—the interaction of desert dust and the southern margins of rain cloud systems in Israel.

Rosenfeld, D., Nirel, R., *Journal of applied meteorology,* Sep. 1996, 35(9), World Meteorological Organization Scientific Conference on Weather Modification, 6th, Paestum, Italy, May-June, 1994. Selected papers, p.1502-1510, 26 refs.

Precipitation (meteorology), Cloud physics, Cloud seeding, Fronts (meteorology), Weather modification, Aerosols, Dust, Rain, Mass transfer, Fallout, Seasonal variations, Statistical analysis, Israel

51-2407

Effects of desert particles coated with sulfate on rain formation on the eastern Mediterranean.

Levin, Z., Ganor, E., Gladstein, V., *Journal of applied meteorology,* Sep. 1996, 35(9), World Meteorological Organization Scientific Conference on Weather Modification, 6th, Paestum, Italy, May-June, 1994. Selected papers, p.1511-1523, 32 refs.

Precipitation (meteorology), Synoptic meteorology, Marine meteorology, Dust, Aerosols, Artificial nucleation, Hygroscopic nuclei, Cloud physics, Cloud droplets, Geochemistry, Heterogeneous nucleation, Ice formation, Chemical composition, Cloud seeding, Correlation, Mediterranean Sea

51-2408

Results of experiments on convective precipitation enhancement in the Camaguey experimental area, Cuba.

Koloskov, B., et al, Russia, *Journal of applied meteorology,* Sep. 1996, 35(9), World Meteorological Organization Scientific Conference on Weather Modification, 6th, Paestum, Italy, May-June, 1994. Selected papers, p.1524-1534, 17 refs.

Precipitation (meteorology), Cloud seeding, Silver iodide, Artificial nucleation, Weather modification, Cloud physics, Radar echoes, Cloud height indicators, Air temperature, Classifications, Forecasting, Statistical analysis, Simulation

51-2409

Crop damage: the hail size factor.

Sánchez, J.L., Fraile, R., de la Madrid, J.L., de la Fuente, M.T., Rodríguez, P., Castro, A., *Journal of applied meteorology,* Sep. 1996, 35(9), World Meteorological Organization Scientific Conference on Weather Modification, 6th, Paestum, Italy, May-June, 1994. Selected papers, p.1535-1541, 22 refs.

Climatology, Turbulent boundary layer, Agriculture, Hail, Plant tissues, Hailstone structure, Damage, Wind velocity, Wind factors, Statistical analysis, Forecasting

51-2410

Study of environmental pollution in a hail-protected area.

Potapov, E.I., Plaude, N.O., Zotov, E.I., *Journal of applied meteorology,* Sep. 1996, 35(9), World Meteorological Organization Scientific Conference on Weather Modification, 6th, Paestum, Italy, May-June, 1994. Selected papers, p.1542-1545, 3 refs.

Precipitation (meteorology), Weather modification, Cloud seeding, Artificial nucleation, Hail prevention, Air pollution, Atmospheric composition, Aerosols, Lead iodide, Silver iodide, Environmental impact, Statistical analysis

51-2411

Use of permutation techniques in evaluating the outcome of a randomized storm seeding experiment.

Fletcher, L., Steffens, F.E., *Journal of applied meteorology,* Sep. 1996, 35(9), World Meteorological Organization Scientific Conference on Weather Modification, 6th, Paestum, Italy, May-June, 1994. Selected papers, p.1546-1550, 5 refs.

Precipitation (meteorology), Cloud physics, Weather modification, Cloud seeding, Thunderstorms, Statistical analysis, Classifications, Accuracy, Weather observations

51-2412

Simulating the influence of type II error on the outcome of past statistical experiments.

Heimbach, J.A., Jr., Super, A.B., *Journal of applied meteorology,* Sep. 1996, 35(9), World Meteorological Organization Scientific Conference on Weather Modification, 6th, Paestum, Italy, May-June, 1994. Selected papers, p.1551-1567, 23 refs.

Precipitation (meteorology), Cloud seeding, Weather modification, Statistical analysis, Models, Accuracy, Simulation, Forecasting

51-2413

New method of assessing snowfall enhancement with silver iodide seeding using physical and chemical techniques.

Warburton, J.A., Chai, S.K., Young, L.G., *Journal of applied meteorology,* Sep. 1996, 35(9), World Meteorological Organization Scientific Conference on Weather Modification, 6th, Paestum, Italy, May-June, 1994. Selected papers, p.1569-1573, 10 refs.

Precipitation (meteorology), Snowfall, Cloud seeding, Weather modification, Aerosols, Heterogeneous nucleation, Snow composition, Impurities, Silver iodide, Meltwater, Sampling, Particle size distribution, Simulation

51-2414

Overview of crop hail damage and evaluation of hail suppression efficiency in Bulgaria.

Simeonov, P., *Journal of applied meteorology,* Sep. 1996, 35(9), World Meteorological Organization Scientific Conference on Weather Modification, 6th, Paestum, Italy, May-June, 1994. Selected papers, p.1574-1581, 20 refs.

Precipitation (meteorology), Weather modification, Thermodynamics, Turbulent boundary layer, Cloud seeding, Hail prevention, Damage, Performance, Statistical analysis, Weather forecasting, Bulgaria

51-2415

Nucleation and characteristic of liquid nitrogen.

Cao, X.C., Wang, W.M., *Journal of applied meteorology,* Sep. 1996, 35(9), World Meteorological Organization Scientific Conference on Weather Modification, 6th, Paestum, Italy, May-June, 1994. Selected papers, p.1582-1586, 3 refs.

Precipitation (meteorology), Liquefied gases, Weather modification, Cloud physics, Smoke generators, Cloud chambers, Ice fog, Fog dispersal, Heterogeneous nucleation, Artificial nucleation, Nucleation rate, Simulation, Temperature effects

51-2416

Effects of ice formation on convective cloud development.

Levi, L., Saluzzi, M.E., *Journal of applied meteorology*, Sep. 1996, 35(9), World Meteorological Organization Scientific Conference on Weather Modification, 6th, Paestum, Italy, May-June, 1994. Selected papers, p.1587-1595, 10 refs.

Clouds (meteorology), Cloud physics, Weather modification, Hail prevention, Artificial nucleation, Convection, Ice formation, Ice vapor interface, Freezing rate, Turbulent diffusion, Mathematical models, Wind factors

51-2417

IGARSS'96. Remote sensing for a sustainable future.

International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996, New York, Institute of Electrical and Electronics Engineers, 1996, 2383p. (4 vols.), Refs. passim. For selected papers see 51-2418 through 51-2516 or A-56713, C-56714, C-56719, C-56722 through C-56725, F-56712, F-56715 through F-56720, F-56726 through F-56728 and I-56721.

DLC QE33.2.R4I57 1996

Remote sensing, Spaceborne photography, Synthetic aperture radar, Radio echo soundings, Radar echoes, Radiometry, Backscattering, Image processing, Terrain identification, Ice surveys, Sea ice distribution, Ice conditions, Ice detection, Glacier surveys, Snow surveys

This is a collection of over 900 papers presented at the International Geoscience and Remote Sensing Symposium (IGARSS'96) held in Lincoln, NE, July 27-31, 1996. Most of the papers deal with global, low- or mid-latitude, or specifically northern high-latitude remote sensing, but 17 papers are pertinent to Antarctica, and deal mainly with satellite remote sensing of the antarctic ice sheet and sea ice. They include discussions on the possibility of using satellite scatterometers, originally designed to measure wind speed and direction over the ocean from sea surface backscattering data, to determine backscattering signatures from sea ice. Also included are papers on the Alaska SAR (synthetic aperture radar) Facility, which has installed a downlink at McMurdo Station for the Canadian RADARSAT to begin operation on the Antarctic Mapping Project in mid-1996.

51-2418

Dual-frequency three-dimensional images of clouds.

Firda, J.M., Sekelsky, S.M., McIntosh, R.E., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.1-3, 2 refs.

DLC QE33.2.R4I57 1996

Cloud physics, Cloud cover, Precipitation (meteorology), Thunderstorms, Hail, Radar tracking, Radar photography

51-2419

Dielectric constants for melting hydrometeors as derived from a numerical method.

Meneghini, R., Liao, L., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.16-18, 4 refs.

DLC QE33.2.R4I57 1996

Cloud physics, Precipitation (meteorology), Falling snow, Snow pellets, Snow water content, Wet snow, Snow melting, Ice dielectrics, Radar echoes

51-2420

RADARSAT processing system at ASF.

Leung, K., Chen, M., Shimada, J., Chu, A., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.43-47, 13 refs.

DLC QE33.2.R4I57 1996

Terrain identification, Spaceborne photography, Synthetic aperture radar, Image processing, Data processing, Data transmission

51-2421

Retrieval of arctic surface conditions and cloud properties from AVHRR data: a time series for the Beaufort Sea.

Meier, W., Maslanik, J., Key, J., Fowler, C., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.73-75, 13 refs.

DLC QE33.2.R4I57 1996

Ice surveys, Sea ice distribution, Ice heat flux, Ice temperature, Surface temperature, Cloud cover, Albedo, Radiometry, Spaceborne photography, Beaufort Sea

51-2422

Using temporal information in an automated classification of summer, marginal ice zone imagery.

Haverkamp, D., Tsatsoulis, C., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.109-111, 8 refs.

DLC QE33.2.R4I57 1996

Ice surveys, Sea ice distribution, Ice edge, Ice water interface, Ice detection, Terrain identification, Synthetic aperture radar, Spaceborne photography, Image processing, Beaufort Sea

51-2423

Texture representation of SAR sea ice imagery using multi-displacement co-occurrence matrices.

Soh, L.K., Tsatsoulis, C., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.112-114, 13 refs.

DLC QE33.2.R4I57 1996

Ice surveys, Sea ice distribution, Ice conditions, Ice detection, Ice edge, Synthetic aperture radar, Image processing

51-2424

Phase correction for coherent noise reduction in short-range radar measurements.

Beaven, S.G., Gogineni, S.P., Kanagaratnam, P., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.115-117, 4 refs.

DLC QE33.2.R4I57 1996

Ice surveys, Sea ice distribution, Ice conditions, Ice detection, Backscattering, Image processing

51-2425

In-situ measurement of the complex dielectric constant of sea ice from 1 to 10 GHz.

Nassar, E., Lee, R., Jezek, K.C., Young, J., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.118-120, 4 refs.

DLC QE33.2.R4I57 1996

Sea ice, Salt ice, Artificial ice, Ice dielectrics, Ice electrical properties, Ice salinity, Electrical measurement, Probes

51-2426

Nearshore ice surface roughness surveys on Lake Superior.

Pilant, D., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.121-123, 8 refs.

DLC QE33.2.R4I57 1996

Lake ice, Fast ice, Ice surveys, Ice surface, Ice cover thickness, Snow ice interface, Topographic surveys, Radio echo soundings, Radiometry, Spaceborne photography, Superior, Lake

51-2427

Error characteristics of the SIR resolution enhancement algorithm.

Early, D.S., Long, D.G., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.124-126, 5 refs.

DLC QE33.2.R4I57 1996

Ice surveys, Sea ice distribution, Drift, Spaceborne photography, Radar echoes, Backscattering, Image processing

51-2428

Quantification of sea ice melt features from low level aerial photographs.

Derksen, C.P., Piwowar, J.M., LeDrew, E.F., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.127-129, 7 refs.

DLC QE33.2.R4I57 1996

Sea ice, Ice surveys, Ice conditions, Ice surface, Ice melting, Snow ice interface, Albedo, Aerial surveys

51-2429

Mapping snow properties for spatially distributed snow hydrological modeling in mountainous areas using passive microwave remote sensing data.

Wilson, L.L., Tsang, L., Hwang, J.N., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.130-132, 7 refs.

DLC QE33.2.R4I57 1996

Snow surveys, Snow cover distribution, Snow hydrology, Snow water equivalent, Snow heat flux, Snow temperature, Runoff forecasting, Radiometry, Spaceborne photography, Image processing, Computerized simulation

51-2430

Snow classification from SSM/I data over varied terrain using an artificial neural network classifier.

Sun, C.Y., Neale, C.M.U., McDonnell, J.J., Cheng, H.D., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.133-135, 12 refs.

DLC QE33.2.R4I57 1996

Snow surveys, Snow cover distribution, Snow temperature, Snow water content, Vegetation patterns, Terrain identification, Radiometry, Spaceborne photography, Image processing, Computer applications

51-2431

Snow mapping with SIR-C multipolarization SAR in Tienshan Mountains.

Li, Z., Shi, J.C., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.136-138, 7 refs.

DLC QE33.2.R4I57 1996

Snow surveys, Snow cover distribution, Snow line, Ice detection, Terrain identification, Synthetic aperture radar, Spaceborne photography, Image processing, China—Tian Shan

51-2432

Recent progress in development of the Moderate Resolution Imaging Spectroradiometer snow cover algorithm and product.

Riggs, G., Hall, D.K., Salomonson, V.V., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.139-141, 4 refs.

DLC QE33.2.R4I57 1996

Snow surveys, Snow cover distribution, Terrain identification, Radiometry, Spaceborne photography, Image processing, Computerized simulation

51-2433

Variations in radar backscatter across the great ice sheets.

Noltimier, K.F., Jezek, K.C., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.142-144, 6 refs.

DLC QE33.2.R4I57 1996

Ice sheets, Glacier surveys, Snow ice interface, Firn stratification, Glacial hydrology, Synthetic aperture radar, Radio echo soundings, Backscattering, Spaceborne photography

Radar backscatter over the great ice sheets is modulated by the near surface properties of polar firn. These properties (grain size, density, stratigraphy, wetness) change in time and from region to region. Information was compiled on the spatial variation in backscatter across selected parts of Antarctica and Greenland from ERS-1 SAR data. The SAR-derived $\sigma°$ compared favorably with both *in situ* and the ERS-1 scatterometer data obtained from literature. These results will be used to refine processing schemes for the Radarsat Antarctic Mapping Project. A plot of the azimuthal anisotropy of SAR-derived $\sigma°$ was created to determine the magnitude of azimuthal anisotropy on a pixel by pixel basis. Azimuthal variability for a region of the Antarctic Peninsula was found to vary from 0 to 14dB. (Auth.)

51-2434

Geophysical Data Management System.

Baggeroer, P.A., Jezek, K.C., Hart, D.G., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.145-147, 1 ref.

DLC QE33.2.R4I57 1996

Glacier surveys, Ice surveys, Synthetic aperture radar, Spaceborne photography, Data processing, Data transmission, Research projects

The Geophysical Data Management System (GDMS) at the Byrd Polar Research Center of Ohio State University, is described. The GDMS provides an archive of data sets of satellite SAR images of Greenland and Antarctica. Data from the Radarsat Antarctic Mapping Project is to be included. Researchers may access the GDMS on the World Wide Web (WWW) at http://polestar.mps.ohio-state.edu/gdms/GDMS.html

51-2435

Ice sheet margin detection using ERS-1 synthetic aperture radar.

Sohn, H.G., Jezek, K.C., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.148-150, 6 refs.

DLC QE33.2.R4I57 1996

Ice sheets, Glacier surveys, Glacier oscillation, Ice detection, Terrain identification, Synthetic aperture radar, Spaceborne photography, Image processing, Greenland

51-2436

Mapping methane emission from arctic tundra using satellite data, a digital elevation model, and discriminant functions based on field data.

Shippert, M.M., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.169-171, 21 refs.

DLC QE33.2.R4I57 1996

Tundra climate, Tundra soils, Tundra vegetation, Vegetation patterns, Plant physiology, Soil microbiology, Biomass, Nutrient cycle, Atmospheric composition, Spaceborne photography

51-2437

Analysis of the Canadian boreal forest using enhanced resolution ERS-1 scatterometer imagery.

Wilson, C.J., III, Long, D.G., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.218-220, 5 refs.

DLC QE33.2.R4I57 1996

Taiga, Forest canopy, Forest tundra, Tundra vegetation, Vegetation patterns, Snow cover effect, Terrain identification, Backscattering, Spaceborne photography, Canada

51-2438

Modeling of forested areas for real and synthetic aperture imaging radar simulation.

Stuopis, P.A., Henson, J.M., Davis, R.E., Hall, K., MP 3955, International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.254-256, 5 refs.

DLC QE33.2.R4I57 1996

Forest canopy, Forest land, Vegetation patterns, Terrain identification, Side looking radar, Synthetic aperture radar, Radar photography, Photographic reconnaissance, Environment simulation, Image processing

The following paper provides a discussion of several procedures for generating elevation and terrain category database information for the modeling of deciduous, coniferous, and mixed forested areas. Specifically, techniques for the geometric modeling of individual pine and oak trees, based on measured or estimated location, height, and canopy diameter are presented. Techniques for randomly populating forested areas at user specified densities with individual trees are discussed. Considerable simulated imagery has been developed for both solid canopy forest and individual tree forest models. In the case of forests modeled as collections of individual trees, imagery has been developed for forests with varying tree densities. Simulated image presentations (grey level and pseudo-color) include sidelooking SAR range and ground range imagery and forward scan B-Scope and P-Scope range and ground range imagery. All modeling and simulation was accomplished using the Synthetic Aperture Reconnaissance, Tactical, and Camouflage (SARTAC) imaging radar simulation and analysis tool developed at the University of Nevada with the support of the U.S. Army Corps of Engineers Cold Regions Research and Engineering Laboratory (USACE/CRREL) and the U.S. Army Corps of Engineers Waterway Experiment Station (USACE/WES).

51-2439

Analysis of dual-wavelength dual-polarization returns from frozen hydrometeors.

Meneghini, R., Iguchi, T., Liao, L., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.554-556, 2 refs.

DLC QE33.2.R4I57 1996

Cloud physics, Precipitation (meteorology), Falling snow, Snow pellets, Particle size distribution, Airborne radar, Radio echo soundings, Radar echoes

51-2440

Polarimetric method for ice water content determination.

Ryzhkov, A.V., Zrnic, D.S., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.557-559, 8 refs.

DLC QE33.2.R4I57 1996

Cloud physics, Precipitation (meteorology), Snowstorms, Ice crystal size, Ice detection, Water content, Radar echoes, Radio echo soundings

51-2441

Simulation of dual-polarization bistatic scattering from rain and hail.

Aydin, K., Park, S.H., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.560-562, 9 refs.

DLC QE33.2.R4I57 1996

Hailstones, Raindrops, Ice detection, Ice crystal size, Particle size distribution, Radio echo soundings

51-2442

Computational study of millimeter wave scattering from bullet rosette type ice crystals.

Aydin, K., Walsh, T.M., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.563-565, 14 refs.

DLC QE33.2.R4I57 1996

Cloud physics, Ice crystal structure, Ice detection, Radio echo soundings, Radar echoes

51-2443

Multiparameter radar snowfall estimation using neural network techniques.

Xiao, R.R., Chandrasekar, V., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.566-568, 5 refs.

DLC QE33.2.R4I57 1996

Snowstorms, Snowfall, Snow depth, Weather forecasting, Radar echoes, Radio echo soundings, Computerized simulation

51-2444

Land applications of ERS-1 Wind Scatterometer in boreal forest zone.

Pulliainen, J., Walker, N., Manninen, T., Hallikainen, M., Grandell, J., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.583-585, 5 refs.

DLC QE33.2.R4I57 1996

Forest canopy, Forest soils, Vegetation patterns, Soil freezing, Frost penetration, Soil water, Moisture detection, Terrain identification, Backscattering, Radio echo soundings, Spaceborne photography

51-2445

Future opportunities and issues in radar remote sensing of Earth's high latitudes.

Carsey, F., Wales, C., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.634-635.

DLC QE33.2.R4I57 1996

Ice surveys, Glacier surveys, Synthetic aperture radar, Spaceborne photography, Research projects, Data processing, Data transmission

The Alaska SAR Facility (ASF) is now downlinking data for science and operational users from four satellites: the European ERS-1 and -2, the Japanese JERS-1, and the Canadian RADARSAT. Among higher-level products envisioned are a complete RADARSAT SAR map of Antarctica and ERS Tandem Mission fringe maps of Antarctica and parts of Alaska. (Auth. mod.)

51-2446

Expected errors in satellite-derived estimates of the high latitude surface radiation budget.

Key, J.R., Stone, R.S., Schweiger, A.J., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.636-638, 7 refs.

DLC QE33.2.R4I57 1996

Polar atmospheres, Marine atmospheres, Cloud cover, Snow heat flux, Radiation balance, Albedo, Surface temperature, Radiometry, Spaceborne photography

51-2447

Multitemporal analysis of fast sea ice albedo using AVHRR data.

De Abreu, R.A., LeDrew, E.F., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.639-641, 4 refs.

DLC QE33.2.R4I57 1996

Fast ice, Ice surveys, Ice heat flux, Ice melting, Snow ice interface, Albedo, Radiometry, Spaceborne photography, Canada—Northwest Territories—Resolute Passage

51-2448

Assessing variability and trends in arctic sea ice distribution using satellite data.

Bel'chanskiĭ, G.I., Mordvintsev, I.N., Douglas, D.C., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.642-644, 3 refs.

DLC QE33.2.R4I57 1996

Ice surveys, Sea ice distribution, Ice conditions, Ice edge, Spaceborne photography, Statistical analysis, Barents Sea, Russia—Kara Sea

51-2449

Image time series analysis of arctic sea ice.

Piwowar, J.M., Wessel, G.R.I., LeDrew, E.F., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.645-647, 5 refs.

DLC QE33.2.R4I57 1996

Ice surveys, Sea ice distribution, Ice conditions, Ice edge, Radiometry, Spaceborne photography, Image processing, Statistical analysis

51-2450

Analysis of Odden event intra- and inter-annual variability.

Fischer, K.W., Russel, C.A., Shuchman, R.A., Josberger, E.G., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.648-650, 3 refs.

DLC QE33.2.R4I57 1996

Ice surveys, Pack ice, Sea ice distribution, Ice conditions, Ice edge, Ice growth, Ice melting, Air ice water interaction, Drift, Spaceborne photography, Statistical analysis, Greenland Sea

51-2451

Remote sensing data availability from the Earth Observation System (EOS) via the Distributed Active Archive Center (DAAC) at NSIDC.

Weaver, R.L., Troisi, V.J., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.651-655, 5 refs.

DLC QE33.2.R4I57 1996

Ice surveys, Snow surveys, Glacier surveys, Research projects, Spaceborne photography, Data processing, Data transmission

51-2452

Rayleigh lidar observations during arctic summer conditions.

Thayer, J.P., Nielsen, N.B., Kerr, R.B., Noto, J., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.686-690, 4 refs.

DLC QE33.2.R4I57 1996

Polar atmospheres, Stratosphere, Atmospheric physics, Lidar, Light scattering, Greenland

51-2453

Electromagnetic scattering based on pair distribution functions retrieved from planar snow sections.

Zurk, L.M., Tsang, L., Shi, J.C., Davis, R.E., MP 3956, International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.754-756, 6 refs.

DLC QE33.2.R4I57 1996

Snow crystal structure, Snow cover structure, Snow density, Snow electrical properties, Ice crystal replicas, Ice crystal size, Particle size distribution, Wave propagation, Scattering, Stereophotography, Statistical analysis

Electromagnetic wave propagation and scattering in dense media depends on the 3-D pair distribution function of particle positions. Recent efforts in the snow community have concentrated on analyzing planar snow sections to obtain 2-D stereological data. In this paper the authors calculate the volume 3-D pair distribution function from the 2-D stereological data. A log-normal distribution of particle sizes is assumed for the ice grains in snow with the distribution parameters derived from stereological measurements. The 3-D pair function can be expressed as a weighted sum of size specific pair functions which are necessary for scattering calculations. The authors choose a small number of representative particle sizes and use a least squares non-linear fit to decompose the 3-D pair function into pair functions for those particles.

51-2454

Modeling of electromagnetic wave scattering from time-varying snowcover.

Ding, K.H., Yang, Y.E., Shih, S.E., Kong, J.A., Davis, R.E., MP 3957, International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.757-759, 7 refs.

DLC QE33.2.R4I57 1996

Snow cover structure, Metamorphism (snow), Snow density, Snow heat flux, Snow electrical properties, Backscattering, Radar echoes, Computerized simulation

In this paper, a study of the effects of time-varying snowcovers on the radar backscatter signatures is presented. To this objective, a snow physics model, known as SNTHERM, is applied to enable the simulation of the dynamical behavior of snowpacks. The SNTHERM model can provide thermal and physical properties such as the temperature profile, liquid water content, and the layering structure which affect the electromagnetic properties of snowpacks. To calculate the backscattering coefficients from snowcovers, the authors employ the dense medium radiative transfer (DMRT) theory with a clustered snow grain microstructure. This coupled model is then used to predict the influence of environmental variation on the millimeter wave radar response, and compare simulation results with snow backscatter measurements. Good agreement is obtained between model and measured data in both timing and magnitude.

51-2455

Global sea ice monitoring from microwave satellites.

Johannessen, O.M., Miles, M.W., Bjørgo, E., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.932-934, 12 refs.

DLC QE33.2.R4I57 1996

Ice surveys, Sea ice distribution, Ice conditions, Ice edge, Radiometry, Spaceborne photography, Statistical analysis

The global sea ice covers can be regularly and frequently monitored using satellite passive microwave sensors. Recent studies using passive microwave have detected significant decreases in arctic ice extent and ice area, with no significant changes in the Antarctic. (Auth. mod.)

51-2456

Sea ice identification using dual-polarized Ku-band scatterometer data.

Yueh, S.H., Kwok, R., Lou, S.H., Tsai, W.Y., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.935-937, 6 refs.

DLC QE33.2.R4I57 1996

Ice surveys, Sea ice distribution, Ice conditions, Ice edge, Ice water interface, Ice detection, Terrain identification, Radio echo soundings, Backscattering, Spaceborne photography

This paper describes a classification algorithm using dual-polarized scatterometer measurements to identify the edge of the sea ice cover in the Arctic and Antarctic. The distinct polarization scattering signatures of sea ice and open water are discussed and illustrated with the dual-polarized radar measurements from the Seasat-A scatterometer (SASS). The analysis of SASS data suggests that the ratio of vertical and horizontal polarization backscatter, denoted as the copol ratio, is a useful discriminator of sea ice and open ocean. A simple classification algorithm using the thresholds of the copol ratio and backscatter levels is proposed. The feasibility of this algorithm is demonstrated using the SASS data from the single-sided, dual-polarization mode. The results indicate that the dual-polarized measurements from the NASA scatterometer (NSCAT) can be used to produce routine maps of sea ice extents. (Auth. mod.)

51-2457

Temporal mixture analysis of SMMR sea ice concentrations.

Piwowar, J.M., Peddle, D.R., LeDrew, E.F., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.938-940, 3 refs.

DLC QE33.2.R4I57 1996

Ice surveys, Sea ice distribution, Ice conditions, Ice edge, Ice water interface, Ice detection, Terrain identification, Radiometry, Spaceborne photography, Image processing

51-2458

Polarimetric backscattering at 23 cm wavelength from antarctic lead ice and estimation of ice thickness.

Winebrenner, D.P., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.941-943, 4 refs.

DLC QE33.2.R4I57 1996

Ice surveys, Sea ice distribution, Ice openings, Ice water interface, Ice cover thickness, Ice conditions, Ice detection, Synthetic aperture radar, Backscattering, Spaceborne photography, Image processing, Antarctica—Weddell Sea, Beaufort Sea

New data from the Shuttle Imaging Radar-C (SIR-C) mission in Oct. 1994 showing leads in the northern Weddell Sea are presented and compared with images from the Beaufort Sea. As in the Beaufort Sea, essentially no surface observations are available, but conventional SAR imagery suggests the presence of lead ice of at least two distinct ages in close proximity in the Weddell scene. Ice regions in the two categories show spatially coherent, but quite different, polarimetric signatures at L-band, including copolar phases larger than neighboring thicker ice in one case and smaller in the other. It is suggested that though still uncertain for now, the possibility of estimating lead ice thickness directly from snapshot and time-sequential L-band polarimetric synthetic aperture radar imagery is promising for the future. (Auth. mod.)

51-2459

Characterization of ice in the Chukchi Sea at the start of the growing season using satellite SAR.

Onstott, R.G., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.944-946, 3 refs.

DLC QE33.2.R4I57 1996

Ice surveys, Sea ice distribution, Ice conditions, Ice detection, Sea water freezing, Freezeup, Ice formation, Ice growth, Synthetic aperture radar, Spaceborne photography, Chukchi Sea, Beaufort Sea

51-2460

Bistatic microwave investigations of sea ice-like media.

May, G.C., Bredow, J.W., Jin, J.Y., Nadimi, S.A., Fung, A.K., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.947-949, 4 refs.

DLC QE33.2.R4I57 1996

Artificial ice, Sea ice, Salt ice, Ice electrical properties, Ice dielectrics, Radar echoes, Environment simulation, Environmental tests, Image processing

51-2461

Validation of a sea ice model using forward simulation of ERS-1 SAR data: a case study in the Beaufort Sea.

Heinrichs, J., Maslanik, J., Steffen, K., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.950-952, 10 refs.

DLC QE33.2.R4I57 1996

Ice surveys, Sea ice distribution, Ice conditions, Ice models, Ice forecasting, Synthetic aperture radar, Backscattering, Spaceborne photography, Environment simulation, Computerized simulation, Beaufort Sea

51-2462

Influence of cloud cover on the microwave scattering coefficient (σ°) of first-year and multiyear sea ice.

Barber, D.G., Thomas, A., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.953-955, 2 refs.

DLC QE33.2.R4I57 1996

Ice surveys, Sea ice distribution, Ice conditions, Ice detection, Ice electrical properties, Snow ice interface, Cloud cover, Terrain identification, Synthetic aperture radar, Backscattering, Spaceborne photography

51-2463

Comparison of aircraft and DMSP SSM/I passive microwave measurements over the Bering Sea in April 1995.

Cavalieri, D.J., Hall, D.K., Wang, J.R., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.956-958, 6 refs.

DLC QE33.2.R4I57 1996

Ice surveys, Sea ice distribution, Ice conditions, Ice detection, Snow ice interface, Polynyas, Terrain identification, Radiometry, Aerial surveys, Airborne radar, Spaceborne photography, Bering Sea

51-2464

Multi-channel algorithm approach to determining melt for arctic sea ice using passive microwave data.

Anderson, M.R., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.959-962, 5 refs.

DLC QE33.2.R4I57 1996

Ice surveys, Sea ice, Ice melting, Snow ice interface, Snowmelt, Snow temperature, Ice temperature, Radiometry, Spaceborne photography

51-2465

Application of interferometry to studies of glacier dynamics.

Mohr, J.J., Madsen, S.N., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.972-974, 5 refs.

DLC QE33.2.R4I57 1996

Glacier surveys, Glacier flow, Glacier oscillation, Glacier mass balance, Aerial surveys, Spaceborne photography, Greenland

51-2466

Effect of compression on physical parameters derived from polar ice radiances.

St. Germain, K.M., Sayood, K., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.1026-1028, 7 refs.

DLC QE33.2.R4I57 1996

Ice surveys, Sea ice distribution, Ice conditions, Ice detection, Radiometry, Radar echoes, Spaceborne photography, Image processing

51-2467

Comparison of spatial statistics of SAR-derived and in-situ soil moisture estimation.

Hirsave, P.P., et al, MP 3958, International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.1073-1075, 8 refs.

DLC QE33.2.R4I57 1996

Soil surveys, Soil water, Moisture detection, Synthetic aperture radar, Spaceborne photography, Image processing, Statistical analysis

The technology of using spaceborne SAR systems for soil moisture estimation has been refined over the last few years. In order to reduce the confounding effects of surface roughness on soil moisture inversion, multifrequency SAR systems have shown promise. The Shuttle Imaging Radar (SIR-C) has an onboard SAR system operating at L, C, and X bands for high resolution imaging of the earth's surface. Over the early part of Oct. 1994, the SIR-C SAR collected radar reflectance data from two sites near Concord, NH. SIR-C data were collected on four consecutive days and concurrent ground truth measurements were also made of the actual soil moisture distribution at the test sites. The objective of the study was to evaluate the radar system's ability not only to estimate soil moisture, but also to characterize its spatial variability. The SIR-C derived and the *in situ* soil moisture estimates compared well not only for the mean soil moisture of each pixel, but also for the spatial statistical parameters, such as correlation lengths and the gradients of soil moisture.

51-2468

Prototype sea ice mapping system using a geographical information system and expert knowledge.

Williams, R.N., Hartnett, J., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.1111-1113, 6 refs.

DLC QE33.2.R4I57 1996

Ice surveys, Sea ice distribution, Ice conditions, Ice reporting, Ice navigation, Ice routing, Radiometry, Spaceborne photography, Data transmission, Image processing, Computer programs, Antarctica—Casey Station, Antarctica—Mawson Station, Antarctica—Davis Station

An operational sea ice mapping system is being developed which will assist meteorologists at the Casey antarctic base to create sea ice maps, from NOAA AVHRR imagery received at the base itself. The system will take AVHRR imagery initially processed via the McIdas meteorological system, and initiate an interactive procedure which assists the expert interpreter to produce a sea ice map from the imagery. A prototype system, called ICEMAPPER, has been developed. It is based on an existing geographical information system and uses production rules, incorporating expert knowledge derived both from the scientific literature and from local sea ice interpreters, to provide an initial classification. If the expert is satisfied with the map produced it can be printed out. If not, thresholds used in the production rules can be altered interactively and the map recreated. (Auth.)

51-2469

Alaska SAR Facility education outreach.

Sandberg, D., Carsey, F., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.1181-1183.

DLC QE33.2.R4I57 1996

Education, Organizations, Research projects, Glaciology, Data processing, Data transmission

51-2470

Observations of sea ice physical properties during the sea ice electromagnetics initiative.

Gow, A.J., Perovich, D.K., MP 3959, International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.1184-1186, 2 refs.

DLC QE33.2.R4I57 1996

Ice surveys, Sea ice, Salt ice, Artificial ice, Ice microstructure, Ice electrical properties, Ice salinity, Ice temperature, Ice density, Environmental tests, Radiometry, Statistical analysis

An Office of Naval Research sponsored sea ice electromagnetics research initiative has been directed towards relating the observed variability in sea ice electromagnetic signatures to changes in sea ice physical properties, and then using this information to develop forward and inverse models. In this paper the authors present an overview of laboratory and field observations made of sea ice physical properties during the past three years. This description included a statistical characterization of the ice microstructure. The authors present these observations in the context of tracing the development of sea ice. The laboratory studies included *in situ* measurements of the physical and electromagnetic properties of young ice sheets grown under both quiescent and active conditions.

51-2471

Physical and electrical characteristics of snow on sea ice; implications for forward scattering model development.

Barber, D.G., Drobot, S.D., Iacozza, J., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.1187-1189, 3 refs.

DLC QE33.2.R4I57 1996

Sea ice, Snow ice interface, Snow electrical properties, Snow stratigraphy, Snow cover structure, Snow density, Ice salinity, Ice dielectrics, Statistical analysis

51-2472

Sea ice polarimetric backscatter signatures at C band.

Nghiem, S.V., et al, MP 3960, International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.1190-1192, 4 refs.

DLC QE33.2.R4I57 1996

Ice surveys, Sea ice, Ice detection, Ice electrical properties, Ice temperature, Ice structure, Synthetic aperture radar, Backscattering

This paper presents C-band polarimetric backscatter signatures of sea ice measured during CRRELEX (Cold Regions Research and Engineering Laboratory Experiment) from 1993 to 1995. Observed radar backscatter of sea ice is related to sea ice physical characteristics. Complex scattering models for sea ice are developed and used to interpret measured radar data with sea ice physical parameters. These results for sea ice at C-band are important for applications to remote sensing data acquired with many airborne and spaceborne C-band synthetic aperture radars.

51-2473

Polarimetric properties of simulated sea ice with special focus on property retrieval and important scattering processes.

Onstott, R.G., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.1193-1195.

DLC QE33.2.R4I57 1996

Sea ice, Salt ice, Artificial ice, Ice electrical properties, Radar echoes, Polarization (waves), Backscattering, Environmental tests

51-2474
Ultra-wideband radar measurements over bare and snow-covered saline ice.
Gogineni, S.P., Kanagaratnam, P., Jezek, K.C., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.1196-1198, 2 refs.
DLC QE33.2.R4I57 1996
Sea ice, Salt ice, Artificial ice, Snow ice interface, Ice electrical properties, Radar echoes, Backscattering, Environmental tests

51-2475
Microwave and thermal infrared emission from young sea ice and pancake ice.
Grenfell, T.C., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.1199-1201, 6 refs.
DLC QE33.2.R4I57 1996
Sea ice, Salt ice, Young ice, Artificial ice, Ice electrical properties, Ice detection, Radiometry, Radar echoes, Environmental tests

51-2476
Modeling of ice thickness effect and its application to data interpretation.
Fung, A.K., Onstott, R.G., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.1202-1204, 3 refs.
DLC QE33.2.R4I57 1996
Sea ice, Salt ice, Artificial ice, Ice cover thickness, Ice electrical properties, Ice dielectrics, Ice air interface, Ice water interface, Ice detection, Radio echo soundings, Backscattering, Environmental tests

51-2477
Inversion of wideband microwave reflectivity to estimate the thickness of arctic lead-like sea ice.
Winebrenner, D.P., Sylvester, J., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.1205-1207, 4 refs.
DLC QE33.2.R4I57 1996
Ice surveys, Sea ice distribution, Ice cover thickness, Ice openings, Ice water interface, Ice detection, Ice electrical properties, Radio echo soundings, Reflectivity, Computerized simulation

51-2478
Thickness retrieval using time series electromagnetic measurements of laboratory grown saline ice.
Shih, S.E., Ding, K.H., Nghiem, S.V., Hsu, C.C., Kong, J.A., Jordan, A.K., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.1208-1210, 5 refs.
DLC QE33.2.R4I57 1996
Sea ice, Salt ice, Artificial ice, Ice electrical properties, Ice cover thickness, Ice detection, Radio echo soundings, Radar echoes, Computerized simulation, Environmental tests

51-2479
Cloud masking with satellite infrared images over polar oceans.
Schlueter, N., Markus, T., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.1247-1249, 3 refs.
DLC QE33.2.R4I57 1996
Sea ice distribution, Ice conditions, Ice detection, Cloud cover, Terrain identification, Infrared photography, Spaceborne photography, Image processing

51-2480
Alaska SAR Facility overview in the Radarsat era.
Cuddy, D., Leung, K., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.1358-1360, 4 refs.
DLC QE33.2.R4I57 1996
Spaceborne photography, Synthetic aperture radar, Data transmission, Data processing, Research projects, Antarctica—McMurdo Station
The Alaska SAR Facility at the University of Alaska, Fairbanks, which archives synthetic aperture radar data from the European ERS-1, ERS-2, and Japanese JERS-1 satellites, has installed a receiving station at McMurdo, Antarctica, to include data from the Canadian RADARSAT, launched in Nov. 1995. The facility at McMurdo is expected to be operational in mid-1996 and will provide daily satellite data including flight information.

51-2481
SIMMS'93 SAR polarimetry experiment: combined surface and airborne radar measurements for winter sea ice.
Livingstone, C.E., Barber, D.G., Spiring, F., Liu, W., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1996, p.1515-1519, 7 refs.
DLC QE33.2.R4I57 1996
Ice surveys, Sea ice distribution, Ice conditions, Ice detection, Ice electrical properties, Ice structure, Snow ice interface, Ice salinity, Synthetic aperture radar, Airborne radar, Backscattering, Polarization (waves), Canada—Northwest Territories—Resolute Passage, Canada—Northwest Territories—Barrow Strait

51-2482
Ice roughness classification and ERS SAR imagery of arctic sea ice: evaluation of feature-extraction algorithms by genetic programming.
Daida, J.M., Onstott, R.G., Bersano-Begey, T.F., Ross, S.J., Vesecky, J.F., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1996, p.1520-1522, 4 refs.
DLC QE33.2.R4I57 1996
Ice surveys, Sea ice, Ice cover thickness, Ice surface, Ice deformation, Pressure ridges, Ice detection, Synthetic aperture radar, Spaceborne photography, Image processing, Beaufort Sea

51-2483
Microwave technique for mapping ice temperature in the arctic seasonal ice zone.
St. Germain, K.M., Cavalieri, D.J., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1996, p.1523-1525, 7 refs.
DLC QE33.2.R4I57 1996
Ice surveys, Sea ice distribution, Ice conditions, Ice detection, Ice air interface, Ice heat flux, Ice temperature, Radiometry, Spaceborne photography

51-2484
Neural network sea ice edge classifier for the NASA scatterometer.
Alhumaidi, S.M., Jones, W.L., Park, J.D., Ferguson, S., Thursby, M.H., Yueh, S.H., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1996, p.1526-1528, 6 refs.
DLC QE33.2.R4I57 1996
Sea ice distribution, Ice conditions, Ice edge, Ice water interface, Ice detection, Wind (meteorology), Marine meteorology, Radio echo soundings, Backscattering, Spaceborne photography, Image processing
The NASA Scatterometer (NSCAT) to be launched in Aug. 1996 is designed to measure wind vectors over ice-free oceans. To prevent contamination of the wind measurements by the presence of sea ice, an algorithm based on only NSCAT data is described. Results are presented for a neural network trained using dual linear polarized Ku-band backscatter measured by the SeaSat-A Satellite Scatterometer (SASS). These results demonstrate the utility of neural network classifiers to provide this ice flag. The algorithm compared well with SASS data from the Antarctic. (Auth mod.)

51-2485
Comparison of open water and thin ice areas derived from satellite passive microwave data with aircraft measurements and satellite infrared data in the Bering Sea.
Markus, T., Cavalieri, D.J., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1996, p.1529-1531, 6 refs.
DLC QE33.2.R4I57 1996
Ice surveys, Sea ice distribution, Ice conditions, Ice detection, Ice cover thickness, Ice heat flux, Ice water interface, Polynyas, Radiometry, Airborne radar, Spaceborne photography, Bering Sea

51-2486
Separating ice-water composites and computing floe size distributions.
Soh, L.K., Haverkamp, D., Tsatsoulis, C., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1996, p.1532-1534, 6 refs.
DLC QE33.2.R4I57 1996
Ice surveys, Sea ice distribution, Ice conditions, Ice detection, Ice edge, Ice floes, Ice water interface, Synthetic aperture radar, Spaceborne photography, Image processing

51-2487
Antarctic Miniature Lidar.
Rall, J.A.R., Abshire, J.B., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1996, p.1538-1540, 8 refs.
DLC QE33.2.R4I57 1996
Polar atmospheres, Cloud cover, Aerosols, Polar stratospheric clouds, Lidar, Meteorological instruments, Antarctica—Amundsen-Scott Station
A second Antarctic Miniature Lidar instrument (Ant Lidar II) has been assembled, tested, and deployed to the NOAA Clean Air Facility (CAF) at the Amundsen-Scott Station. This instrument deployed in Feb. 1996 replaces the first Antarctic Lidar (Ant Lidar I) which operated at the Amundsen-Scott Station from Feb. to July 1995. The new lidar, as in the first instrument, uses redundant commercially available, single element diode lasers, a 20 cm Schmidt-Cassegrain telescope, and a silicon avalanche photodiode (APD) operated in the photon counting mode. The lidar is used to measure clouds, particularly polar stratospheric clouds and aerosol distribution at night. (Auth. mod.)

51-2488
Determining the number of classes for segmentation in SAR sea ice imagery.
Soh, L.K., Tsatsoulis, C., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1996, p.1565-1567, 12 refs.
DLC QE33.2.R4I57 1996
Ice surveys, Sea ice distribution, Ice conditions, Ice detection, Ice structure, Synthetic aperture radar, Spaceborne photography, Image processing

51-2489
Performance evaluation of a spinning flat reflector for millimeter-wave radiometry.
Jacobson, M.D., Nunnelee, W.M., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1996, p.1678-1680, 7 refs.
DLC QE33.2.R4I57 1996
Aircraft icing, Ice detection, Ice forecasting, Ice storms, Supercooled clouds, Weather forecasting, Radiometry

51-2490

RADARSAT Antarctica Mapping System: system overview.

Norikane, L., Wilson, B., Jezek, K.C., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1996, p.1772-1774, 1 ref.

DLC QE33.2.R4157 1996

Mapping, Research projects, Data processing, Data transmission, Synthetic aperture radar, Radiometry, Spaceborne photography, Image processing

In Oct. 1996, RADARSAT will map the entire antarctic continent from space, presenting scientists with an unprecedented snapshot of the entire continent in the microwave spectrum. NASA has charged the Byrd Polar Research Center with the goal of producing a full continental map using this data, subject to a number of constraints to maximize the utility of the data to the scientific community. To meet these requirements, a number of SAR data processing techniques shall be applied including orthorectification processing, block adjustments for ephemeris refinements, simulation techniques and radiometric balancing for automated image seam removal. These techniques shall be implemented in the RADARSAT Antarctica Mapping System being developed by Vexcel Corporation for the Byrd Polar Research Center. (Auth. mod.)

51-2491

RADARSAT: the Antarctic Mapping Project.

Jezek, K.C., et al, International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1996, p.1775-1776, 2 refs.

DLC QE33.2.R4157 1996

Mapping, Research projects, Data processing, Data transmission, Synthetic aperture radar, Spaceborne photography, Image processing

On Nov. 4, 1995, the Canadian RADARSAT was carried aloft by a NASA rocket launched from Vandenberg Air Force Base. RADARSAT is equipped with a C-band Synthetic Aperture Radar (SAR) capable of acquiring high resolution (25 m) images of Earth's surface day or night and under all weather conditions. Along with the attributes familiar to researchers working with SAR data from the European Space Agency's Earth Remote Sensing Satellite and the Japanese Earth Resources Satellite, RADARSAT will have enhanced flexibility to collect data using a variety of swath widths, incidence angles and resolutions. Most importantly, for scientists interested in Antarctica, the agreement for a U.S. launch of RADARSAT includes a provision for rotating in orbit the normally right-looking SAR to a left-looking mode. This 'Antarctic Mode' will provide for the first time a nearly instantaneous, high resolution view of the entirety of Antarctica on each of two proposed mappings separated by 2 years. This is an unprecedented opportunity to finish mapping one of the few remaining uncharted regions of the Earth. (Auth. mod.)

51-2492

McMurdo Ground Station (MGS): ready for SAR acquisition.

Wales, C., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1996, p.1777-1779.

DLC QE33.2.R4157 1996

Mapping, Research projects, Data processing, Data transmission, Synthetic aperture radar, Spaceborne photography, Image processing, Antarctica—McMurdo Station

The McMurdo Ground Station (MGS), a satellite receiving facility on Ross I., was installed in Dec. 1994 by the Ground Networks Division of NASA in concert with the Office of Polar Programs of NSF. Its original purpose was to acquire synthetic aperture radar (SAR) data from the Canadian RADARSAT spacecraft, which was launched in Nov. 1995. To test the system, SAR data from the European ERS-1 spacecraft was successfully acquired by MGS in Jan. 1995 and processed at the Alaska SAR Facility (ASF). The role of the MGS has expanded to include other SAR missions, and its first major role is to support the ERS-1 and ERS-2 tandem mission. The tandem mission should collect three complete coverages of the McMurdo mask during the first half of 1996. In late spring MGS will start receiving and recording SAR data from RADARSAT. Data recorded in summer are expected to be shipped every two weeks; all winter data will be shipped on the first flight out in the spring. (Auth. mod.)

51-2493

Calibration of data from the Antarctic Mapping Mission.

Williams, J., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1996, p.1780-1782, 4 refs.

DLC QE33.2.R4157 1996

Mapping, Research projects, Data processing, Data transmission, Synthetic aperture radar, Spaceborne photography, Image processing

In Oct. of 1996 the RADARSAT SAR will acquire high resolution C-band radar data over the entirety of Antarctica. The mission will last for a period of about 18 days, during which 12 hours of data or approximately 3300 SAR images will be acquired. A substantial effort will be undertaken at the Alaska SAR Facility to ensure that all downlinked data is successfully acquired. To support calibration of the dataset, two transponders have been built and deployed in Antarctica. These transponders, together with other calibration targets in Alaska, Canada and Brazil will be used to calibrate the data. (Auth.)

51-2494

Robust threshold retracking algorithm for extracting ice-sheet surface elevations from satellite radar altimeters.

Davis, C.H., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1996, p.1783-1787, 6 refs.

DLC QE33.2.R4157 1996

Ice sheets, Glacier surveys, Glacier surfaces, Glacier thickness, Topographic surveys, Height finding, Radio echo soundings, Spaceborne photography, Image processing

A threshold retracking algorithm for processing ice-sheet altimeter data from Greenland and Antarctica is presented. The threshold algorithm and three other ice-sheet retracking algorithms were compared. The algorithm comparisons were made using Seasat and Geosat datasets comprised of over 30,000 crossover points. Results show that the threshold retracking algorithm produces ice-sheet surface elevations that are more repeatable than the elevations derived from all the other retracking algorithms. For analysis of long-term change in ice-sheet surface elevations, it is critical that a retracking algorithm produce repeatable elevations. The more consistent an algorithm is in selecting the retracking point the less likely that biases will be introduced by the retracking scheme in the elevation change measurement. For this reason, the robust threshold retracking algorithm has been adopted by NASA/GSFC as an alternative to their existing algorithm for production of ice-sheet altimeter datasets under the NASA Pathfinder program. The threshold algorithm will be used to re-process existing ice-sheet altimeter datasets and to process the datasets from future altimeter missions. (Auth. mod.)

51-2495

Individual weather correction for antarctic sea-ice concentrations from SSM/I.

Thomas, C.H., Heygster, G.C., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1996, p.1788-1790, 13 refs.

DLC QE33.2.R4157 1996

Ice surveys, Sea ice distribution, Ice conditions, Ice edge, Ice detection, Ice air interface, Ice heat flux, Ice temperature, Radiometry, Radio echo soundings, Spaceborne photography, Image processing

Antarctic sea-ice concentration as determined from the brightness temperatures of passive microwave sensors is affected frequently by high values of atmospheric water vapor, cloud liquid water, rain and sea surface roughening by surface winds. A correction scheme for SSM/I taking these influences into account is presented. Over open water, water vapor, liquid water and wind determined from the SSM/I signal serve to reduce the brightness temperatures to clear sky conditions using a radiative transfer model. When applied to a sample scene, the procedure results in reduced mean value for sea-ice extent, sea-ice area and open water, but increased ice concentration. (Auth.)

51-2496

Effect of the grounded tabular icebergs in front of Berkner Island on the Weddell Sea ice drift as seen from satellite passive microwave sensors.

Markus, T., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1996, p.1791-1793, 4 refs.

DLC QE33.2.R4157 1996

Ice surveys, Sea ice distribution, Ice conditions, Ice shelves, Icebergs, Ice islands, Grounded ice, Ice friction, Drift, Polynyas, Radio echo soundings, Spaceborne photography, Antarctica—Berkner Island, Antarctica—Weddell Sea

The huge grounded tabular icebergs in the southern Weddell Sea might have a significant influence on the sea ice drift, because they form a barrier to the clockwise circulation. The influence of these icebergs on the sea ice distribution is studied with ice concentration analyses from satellite passive microwave sensors over an eleven year period. Besides total ice concentration the fractions of the two different types distinguished in the NASA Team algorithm are studied. One is attributed to first-year ice and the other to deformed ice or ice with heavy snow cover. Results show that the ice coverage east of the icebergs has changed from 40% to between 80 and 90% in summer. This happens because the southward drifting sea ice is trapped between the continent on the right and the icebergs on the left. Therefore less ice formation in this area results in less heat exchange and brine release, which might effect the oceanic processes in front and under the ice shelfs. (Auth.)

51-2497

Retrieval of man-made structures in Siberia with INSAR techniques using ERS-SAR data.

Streck, C., Hellwich, O., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1996, p.1836-1838, 5 refs.

DLC QE33.2.R4157 1996

Permafrost beneath structures, Permafrost beneath roads, Pipelines, Tundra terrain, Taiga, Terrain identification, Synthetic aperture radar, Spaceborne photography, Image processing, Russia—Nadym River

51-2498

Nadir and bidirectional surface measurements of arctic tundra: site differentiation and vegetation phenology early in the growing season.

Vierling, L.A., Derring, D.W., Eck, T.F., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.4, New York, Institute of Electrical and Electronics Engineers, 1996, p.1897-1900, 13 refs.

DLC QE33.2.R4157 1996

Tundra climate, Tundra vegetation, Vegetation patterns, Plant ecology, Phenology, Radiometry, Radar echoes, United States—Alaska—North Slope

51-2499

Radar sounding of glaciers in Greenland.

Allen, C., Wohletz, B., Gogineni, S.P., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.4, New York, Institute of Electrical and Electronics Engineers, 1996, p.1932-1934, 5 refs.

DLC QE33.2.R4157 1996

Glacier surveys, Glacier thickness, Glacier oscillation, Glacier mass balance, Glacier beds, Glacier tongues, Radio echo soundings, Airborne radar, Synthetic aperture radar, Greenland

51-2500

Snow and ice observations during the European Multi-sensor Airborne Campaign in 1995.

Noll, J., Wooding, M., Attema, E., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.4, New York, Institute of Electrical and Electronics Engineers, 1996, p.1995-1997, 2 refs.

DLC QE33.2.R4157 1996

Ice surveys, Sea ice distribution, Ice conditions, Ice detection, Snow surveys, Snow cover distribution, Snow water equivalent, Radiometry, Synthetic aperture radar, Airborne radar, Spaceborne photography, Norway, Sweden, Finland

51-2501

Overview of EMAC-95 snow and ice airborne campaign in Finland.

Hallikainen, M., et al, International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.4, New York, Institute of Electrical and Electronics Engineers, 1996, p.1998-2001, 5 refs.

DLC QE33.2.R4I57 1996

Ice surveys, Sea ice distribution, Ice conditions, Polynyas, Snow surveys, Snow cover distribution, Snow water equivalent, Airborne radar, Synthetic aperture radar, Finland

51-2502

Estimation of snow water equivalence using SIR-C/X-SAR.

Shi, J.C., Dozier, J., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.4, New York, Institute of Electrical and Electronics Engineers, 1996, p.2002-2004, 6 refs.

DLC QE33.2.R4I57 1996

Snow surveys, Snow depth, Snow density, Snow hydrology, Snow water equivalent, Spaceborne photography, Synthetic aperture radar, Backscattering, Runoff forecasting

51-2503

Estimation of snow water equivalent using passive microwave radiation data.

Tait, A., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.4, New York, Institute of Electrical and Electronics Engineers, 1996, p.2005-2007, 5 refs.

DLC QE33.2.R4I57 1996

Snow surveys, Snow depth, Depth hoar, Snow temperature, Snow hydrology, Snow water equivalent, Radiometry, Spaceborne photography, Statistical analysis

51-2504

Scattering and emission from dry snow in the range 35-140 GHz.

Tjuatja, S., Fung, A.K., Comiso, J.C., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.4, New York, Institute of Electrical and Electronics Engineers, 1996, p.2008-2010, 8 refs.

DLC QE33.2.R4I57 1996

Snow electrical properties, Snow density, Snow water content, Snow ice interface, Snow temperature, Radiometry, Radar echoes, Backscattering

51-2505

Observations of snow crystal shape in cold snowpacks using scanning electron microscopy.

Foster, J.L., Hall, D.K., Chang, A.T.C., Rango, A., Wergin, W.P., Erbe, E.F., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.4, New York, Institute of Electrical and Electronics Engineers, 1996, p.2011-2013, 7 refs.

DLC QE33.2.R4I57 1996

Snow cover structure, Snow electrical properties, Snow water equivalent, Snow temperature, Snow heat flux, Depth hoar, Snow air interface, Snow crystal structure, Ice crystal replicas, Scanning electron microscopy

51-2506

Dramatic decrease in radar cross section over Greenland observed by the ERS-1 scatterometer between 1991 and 1995.

Wismann, V.R., Boehnke, K., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.4, New York, Institute of Electrical and Electronics Engineers, 1996, p.2014-2016, 6 refs.

DLC QE33.2.R4I57 1996

Ice sheets, Glacial meteorology, Glacial hydrology, Snow ice interface, Snow water content, Snowmelt, Seepage, Synthetic aperture radar, Backscattering, Spaceborne photography, Greenland

51-2507

Analysis of snow cover in Alaska using aircraft microwave data (April 1995).

Hall, D.K., Foster, J.L., Chang, A.T.C., Cavalieri, D.J., Wang, J.R., Benson, C.S., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.4, New York, Institute of Electrical and Electronics Engineers, 1996, p.2246-2248, 7 refs.

DLC QE33.2.R4I57 1996

Snow surveys, Snow cover distribution, Snow depth, Snow temperature, Terrain identification, Airborne radar, Radiometry, United States—Alaska

51-2508

Estimation of snow surface albedo using Landsat Thematic Mapper.

Shi, J.C., Painter, T.H., Dozier, J., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.4, New York, Institute of Electrical and Electronics Engineers, 1996, p.2249-2251, 11 refs.

DLC QE33.2.R4I57 1996

Snow surveys, Snow cover structure, Snow optics, Grain size, Particle size distribution, Albedo, Spaceborne photography

51-2509

Estimating alpine snow cover with unsupervised spectral unmixing.

Rosenthal, W., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.4, New York, Institute of Electrical and Electronics Engineers, 1996, p.2252-2254, 10 refs.

DLC QE33.2.R4I57 1996

Snow surveys, Snow cover distribution, Terrain identification, Spaceborne photography, Image processing, Computer programs

51-2510

Airborne and spaceborne SAR interferometry: application to the Athabasca Glacier area.

Vachon, P.W., et al, International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.4, New York, Institute of Electrical and Electronics Engineers, 1996, p.2255-2257, 7 refs.

DLC QE33.2.R4I57 1996

Mountain glaciers, Glacier surveys, Glacier flow, Glacier oscillation, Airborne radar, Synthetic aperture radar, Spaceborne photography, Canada—Alberta—Rocky Mountains

51-2511

Effects of system errors on combined MM/IR neural network inversion of surface snow properties.

Jackson, S.R., Narayanan, R.M., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.4, New York, Institute of Electrical and Electronics Engineers, 1996, p.2258-2260, 3 refs.

DLC QE33.2.R4I57 1996

Snow surveys, Snow cover structure, Snow surface, Snow water content, Grain size, Particle size distribution, Radiometry, Backscattering, Image processing, Computerized simulation

51-2512

Machine-based snow line determination and the identification of ice sheet features in visible and SAR imagery.

Lin, I.I., Rees, W.G., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.4, New York, Institute of Electrical and Electronics Engineers, 1996, p.2261-2263, 10 refs.

DLC QE33.2.R4I57 1996

Ice sheets, Glacier surveys, Glacier surfaces, Glacier mass balance, Glacier oscillation, Snow line, Spaceborne photography, Image processing, Computerized simulation, Norway—Svalbard, Greenland

51-2513

Thawing of soils in Siberia observed by the ERS-1 scatterometer between 1992 and 1995.

Boehnke, K., Wismann, V.R., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.4, New York, Institute of Electrical and Electronics Engineers, 1996, p.2264-2266, 3 refs.

DLC QE33.2.R4I57 1996

Ground thawing, Thaw depth, Soil surveys, Soil temperature, Soil water, Moisture detection, Terrain identification, Radio echo soundings, Backscattering, Spaceborne photography, Russia—Siberia

51-2514

Passive microwave freeze/thaw classification for wet tundra regions.

Kim, E.J., England, A.W., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.4, New York, Institute of Electrical and Electronics Engineers, 1996, p.2267-2269, 8 refs.

DLC QE33.2.R4I57 1996

Tundra soils, Tundra climate, Soil surveys, Ground thawing, Thaw depth, Soil temperature, Surface temperature, Soil water, Moisture detection, Snow cover distribution, Radio echo soundings, Radiometry, Spaceborne photography, United States—Alaska—North Slope

51-2515

Freeze/thaw classification for prairie soils using SSM/I radiobrightnesses.

Judge, J., Galantowicz, J.F., England, A.W., Dahl, P., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.4, New York, Institute of Electrical and Electronics Engineers, 1996, p.2270-2272, 7 refs.

DLC QE33.2.R4I57 1996

Meadow soils, Soil surveys, Soil freezing, Ground thawing, Soil temperature, Soil water, Moisture detection, Terrain identification, Radiometry, Spaceborne photography, United States—South Dakota

51-2516

Multisensor estimation of vegetation characteristics.

Zhang, J., et al, MP 3961, International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.4, New York, Institute of Electrical and Electronics Engineers, 1996, p.2375-2376, 5 refs.

DLC QE33.2.R4I57 1996

Forest ecosystems, Plant ecology, Vegetation patterns, Forest canopy, Biomass, Terrain identification, Synthetic aperture radar, Spaceborne photography, Image processing, United States—New Hampshire

The case for a multisensor approach to estimate and monitor vegetation characteristics has been well-established. SAR sensors have shown promise in not only classifying vegetation types but also in estimating parameters such as biomass, canopy height, and diameter at breast height (dbh). The accuracy with which vegetation types can be classified and the above parameters estimated can be significantly improved by using data from other optical sensor systems such as color-infrared (IR) imagery and satellite photography. The authors have obtained contemporaneous and coregistered SIR-C SAR and airborne color-IR images as well as satellite photographs of a forested area in New Hampshire. Bayesian classification technique is being investigated in order to classify vegetation into broad classes. Inversion algorithms are also being developed for estimating specific

vegetation parameters once broad classes have been delineated. The added benefit of integrating optical sensor data with the SAR imagery is being studied in terms of classification and estimation accuracy.

51-2517

Antarctic phytoplankton primary production under enhanced flux of ultraviolet radiation: a bio-optical approach.

Boucher, N.P., Santa Barbara, University of California, 1994, 192p., University Microfilms order No. 95-22775, Ph.D. thesis. Refs. passim.

Ozone, Ultraviolet radiation, Plankton, Biomass, Photosynthesis, Marine biology

The link between ozone depletion and increased UV-B irradiance has raised concern and prompted research into the potential impacts of increased UV-B on the ecological balance of Antarctica. One area of prime concern is the possible impact of increased UV-B on the vitality of phytoplankton in the southern ocean. Whereas the spectral increase in radiation associated with the reduction in stratospheric ozone is well known, the effects of the spectral shifts in UV radiation on primary production remain less understood. This dissertation seeks to improve predictive models of phytoplankton productivity in UV-enriched environments. The author combined highly resolved temporal and spatial estimates primary production and UV radiation collected during the spring 1991 west of the Antarctic Peninsula. He shows that ambient UV radiation caused a water column integrated loss of primary production approaching 25%. In comparison to full UVR effects, the short term impact of the 1991 ozone diminution was small but significant: it decreased water column integrated primary production over the region by 2.1%. Long-term ecological consequences of such a diminution remains to be determined. (Auth. mod.)

51-2518

High frequency/automatic link establishment (HF/ALE) radio propagation test to Antarctica.

Gilles, P.E., Katan, J.R., Pease, B.L., *U.S. Naval Undersea Warfare Center Division. Technical report,* Feb. 1, 1994, NUWC-NPT-TR-10427, 194p., ADA-277 730, 6 refs.

Radio communication, Equipment, Radio waves, Low temperature tests, Antarctica—McMurdo Station

Recent federal/military standards in the area of automatic link establishment (ALE) for HF radios have been developed that coordinate frequency selection between communicating terminals, allowing them to adapt to skywave conditions. This study focused on evaluating the utility of these state-of-the-art radios in the polar environment. A quick-look evaluation of this technology was demonstrated over a radio circuit between Christchurch, New Zealand, and McMurdo Station. This transauroral link, operated by the U.S. Navy for the National Science Foundation, is the primary link for all operational, logistical, and emergency communications for U.S. operations between the Antarctic and the outside world. Daily plots of the measured signal-to-noise ratio, probability of bit error, and channel quality are presented, and analyzed. (Auth. mod.)

51-2519

Holocene ice retreat from the Lazarev Sea shelf, East Antarctica.

Gingele, F.X., Kuhn, G., Maus, B., Melles, M., Schöne, T., *Continental shelf research,* Feb. 1997, 17(2), p.137-163, Refs. p.161-163.

Quaternary deposits, Glacial geology, Glacier oscillation, Grounded ice, Ice shelves, Marine deposits, Lithology, Classifications, Sedimentation, Grain size, Clay minerals, Radioactive age determination, Antarctica—East Antarctica

Distinct facies types, classified in radiocarbon-dated sediments from the shelf of the Lazarev Sea, East Antarctica, reveal a detailed history of processes that have controlled sedimentation during the deglaciation over the last 10,000 yr. The ice retreat on this part of the antarctic shelf started 9500 yr BP, marked by the deposition of laminated sediments, deposited from a floating ice shelf. These laminites, which occur on top of diamictons laid down from a grounded ice sheet, are the basal sediments of the postglacial sequence. The intensity of the Antarctic Coastal Current (ACC), directed by shelf morphology, controlled sedimentation of the postglacial facies. Current velocities apparently decreased between 8000 and 2000 yr BP due to a deflection of the ACC by advancing ice tongues to the east of the investigation area during the 'Hypsithermal'. This led to a deposition of fine-grained sediments, and clay mineralogy suggests a continental source, possibly near the grounding line of the Nivl Ice Shelf, rather than a winnowing of sediments near the shelf break or advection from deeper water. (Auth. mod.)

51-2520

Sea-ice processes in the Laptev Sea and their importance for sediment export.

Eicken, H., Reimnitz, E., Aleksandrov, V.IU., Martin, T., Kassens, H., Viehoff, T., *Continental shelf research,* Feb. 1997, 17(2), p.205-233, Refs. p.231-233.

Sea ice distribution, Ice surveys, Marine deposits, Ice shelves, Drift, Freezeup, Radiometry, Sediment transport, Ice rafting, Ice cores, Ice composition, Seasonal variations, Russia—Laptev Sea

51-2521

Abundance of gelatinous carnivores in the nekton community of the Antarctic Polar Frontal Zone in summer 1994.

Pagès, F., White, M.G., Rodhouse, P.G., *Marine ecology progress series,* Oct. 3, 1996, 141(1-3), p.139-147, Refs. p.146-147.

Marine biology, Oceanography, Ecosystems, Biomass, Sampling, Plankton, Antarctica—Scotia Sea

The species composition, abundance, vertical distribution, biovolume and carbon content of gelatinous nekton in the Antarctic Polar Frontal Zone are described from a series of 200 m depth layers between 0 and 1000 m. In total, 13 species of medusa, 6 species of siphonophore, 3 species of ctenophore and 1 species of salp and nemertean were identified. On average gelatinous organisms contributed 69.3% to the biovolume and 30.3% to the carbon content of the samples. Some specific associations and restricted vertical distributions were related to trophic interactions among ostracods, amphipods and cnidarians. Observations made near South Georgia showed that medusae and ctenophores were preyed upon by albatrosses and notothenioid fish respectively. The results support the premise that gelatinous organisms are a major and, at times, are the main component of the oceanic macroplankton/nekton community in the southern ocean. (Auth. mod.)

51-2522

Organic-N loss by efflux and burial associated with a low efflux of inorganic N and with nitrate assimilation in arctic sediments (Svalbard, Norway).

Blackburn, T.H., Hall, P.O.J., Hulth, S., Landén, A., *Marine ecology progress series,* Oct. 3, 1996, 141(1-3), p.283-293, 37 refs.

Oceanography, Subpolar regions, Marine geology, Suspended sediments, Sedimentation, Sampling, Organic nuclei, Geochemical cycles, Diagenesis, Ion diffusion, Norway—Svalbard

51-2523

Frost resistant concrete.

Pigeon, M., Marchand, J., Pleau, R., *Construction and building materials,* July 1996, 10(5), p.339-348, 69 refs.

Concrete durability, Frost resistance, Freeze thaw cycles, Antifreezes, Air entrainment, Porosity, Microstructure, Degradation, Corrosion, Concrete admixtures, Standards

51-2524

Application of mercury intrusion porosimetry on clay bricks to assess freeze-thaw durability—a bibliography with abstracts.

Mallidi, S.R., *Construction and building materials,* Sep. 1996, 10(6), p.461-465, 55 refs.

Bricks, Masonry, Clays, Construction materials, Frost resistance, Porosity, Microstructure, Freeze thaw cycles, Freeze thaw tests, Bibliographies, High pressure tests

51-2525

Fundamental aspects of freeze-cracking.

Hung, Y.C., Kim, N.K., *Food technology,* Dec. 1996, 50(12), p.59-61, 38 refs.

Porous materials, Frozen liquids, Freezing rate, Preserving, Cracking (fracturing), Cryogenics, Stress concentration, Temperature effects, Phase transformations, Ice water interface, Forecasting, Models

51-2526

Properties of hydrogels synthesized by freezing and thawing aqueous polyvinyl alcohol solutions and their applications.

Mori, Y., Tokura, H., Yoshikawa, M., *Journal of materials science,* Jan. 15, 1997, 32(2), p.491-496, 6 refs.

Polymers, Freeze thaw cycles, Freeze thaw tests, Solutions, Mechanical tests, Microstructure, Water content, Scanning electron microscopy, Stress strain diagrams, Tensile properties, Sensors

51-2527

Note on estimate of the glacial-isostatic decay spectrum for Fennoscandia.

Wolf, D., *Geophysical research international,* Dec. 1996, 127(3), p.801-805, 22 refs.

Tectonics, Pleistocene, Glacial geology, Isostasy, Sea level, Viscosity, Stratification, Shoreline modification, Classifications, Spectra, Theories, Accuracy

51-2528

Phase diagram of water in the vicinity of the triple point.

Tkachev, S.N., Nasimov, R.M., Kalinin, V.A., *Journal of chemical physics,* Sep. 1, 1996, 195(9), p.3722-3725, 12 refs.

Ice physics, Water structure, Phase transformations, Ice water interface, Ice melting, High pressure ice, High pressure tests, Thermodynamics, Temperature effects, Stability

51-2529

Interaction of D_2O with Zr(0001) at 80 K.

Li, B., Griffiths, K., Zhang, C.S., Norton, P.R., *Surface science,* Jan. 10, 1997, 370(2-3), p.97-112, 11 refs.

Ice physics, Deuterium oxide ice, Adsorption, Layers, Ice solid interface, Cryogenics, Ice spectroscopy, Temperature effects, Infrared spectroscopy, Thermal analysis, Spectra, Degradation

51-2530

Waterproofing of parking garage structures with sealers and membranes: the Canadian experience.

Litvan, G.G., *Construction and building materials,* Feb. 1996, 10(1), p.95-100, 24 refs.

Concrete structures, Steel structures, Reinforced concretes, Superstructures, Sealing, Frost resistance, Waterproofing, Permeability, Cold weather performance, Winter maintenance, Protection, Corrosion, Freeze thaw tests

51-2531

Ice, ABS, and temperature.

Eddie, R., Accident reconstruction: technology and animation IV, Warrendale, PA, Society of Automotive Engineers, 1994, p.163-168, 7 refs.

DLC HV8079.55.A27 1994

Road icing, Rubber ice friction, Rubber snow friction, Motor vehicles, Brakes (motion arresters), Skid resistance, Traction, Cold weather tests

51-2532

Reconstructing collisions involving ice and slippery surfaces.

Hunter, J.E., Accident reconstruction: technology and animation III, Warrendale, PA, Society of Automotive Engineers, 1993, p.185-193, 8 refs.

DLC HV8079.55.A27 1993

Road icing, Rubber ice friction, Skid resistance, Accidents, Environmental tests

51-2533

Experiments on ice formation from a circular water jet impinging on a horizontal cold surface.

Naraghi, M.N., Moallemi, M.K., Heat transfer in phase change. ASME Heat Transfer Division, HTD-Vol.205, New York, American Society of Mechanical Engineers, 1992, p.1-8, 17 refs. Presented at the 28th National Heat Transfer Conference and Exhibition, San Diego, CA, Aug. 9-12, 1992.

DLC TJ260.H39453 1992

Ice formation, Ice accretion, Ice growth, Ice water interface, Ice solid interface, Water flow, Hydraulic jets, Phase transformations, Heat transfer

51-2534
Experimental study of formation and melting of ice around horizontal tubes: influence of tube array on ice formation and melting characteristics.
Torikoshi, K., Nakazawa, Y., Heat transfer in phase change. ASME Heat Transfer Division, HTD-Vol.205, New York, American Society of Mechanical Engineers, 1992, p.19-25, 3 refs. Presented at the 28th National Heat Transfer Conference and Exhibition, San Diego, CA, Aug. 9-12, 1992.
DLC TJ260.H39453 1992
Air conditioning, Artificial freezing, Artificial melting, Ice formation, Ice melting, Ice water interface, Ice solid interface, Ice thermal properties, Ice heat flux, Heat transfer

51-2535
Microscopic pattern of ice crystal growth in the presence of thermal hysteresis proteins.
Coger, R., Rubinsky, B., Fletcher, G., Heat transfer in phase change. ASME Heat Transfer Division, HTD-Vol.205, New York, American Society of Mechanical Engineers, 1992, p.37-46, 26 refs. Presented at the 28th National Heat Transfer Conference and Exhibition, San Diego, CA, Aug. 9-12, 1992. For another version see 49-411.
DLC TJ260.H39453 1992
Cryobiology, Antifreezes, Ice crystal growth, Physiological effects

51-2536
Response of sea level to global warming.
Solow, A.R., World at risk: natural hazards and climate change, Cambridge, MA, 1992. AIP conference proceedings, No.277, New York, American Institute of Physics, 1993, p.38-42, 12 refs.
DLC GF85.W67 1993
Global warming, Sea level, Glacial meteorology, Glacier ablation

51-2537
Glacier-related hazards and climatic change.
Evans, S.G., Clague, J.J., World at risk: natural hazards and climate change, Cambridge, MA, 1992. AIP conference proceedings, No.277, New York, American Institute of Physics, 1993, p.48-60, 31 refs.
DLC GF85.W67 1993
Global warming, Glacial meteorology, Glacier ablation, Glacial lakes, Lake bursts, Avalanches, Landslides, Mudflows, Accidents

51-2538
Changes in water supply in alpine regions due to glacier retreat.
Pelto, M.S., World at risk: natural hazards and climate change, Cambridge, MA, 1992. AIP conference proceedings, No.277, New York, American Institute of Physics, 1993, p.61-67, 10 refs.
DLC GF85.W67 1993
Mountain glaciers, Glacier ablation, Glacial meteorology, Glacial hydrology, Meltwater, Water reserves, Runoff forecasting, Global warming

51-2539
Synergistic effects of acid deposition and road salts on corrosion.
Baboian, R., Corrosion forms and control for infrastructure. ASTM STP 1137. Edited by V. Chaker, Philadelphia, American Society for Testing and Materials, 1992, p.17-29, 6 refs. Presented at a symposium in San Diego, CA, Nov. 3-4, 1991.
DLC TA445.5.C673 1992
Salting, Environmental impact, Reinforced concretes, Corrosion

51-2540
National cost of damage to infrastructure from highway deicing.
Menzies, T.R., Corrosion forms and control for infrastructure. ASTM STP 1137. Edited by V. Chaker, Philadelphia, American Society for Testing and Materials, 1992, p.30-45, 15 refs. Presented at a symposium in San Diego, CA, Nov. 3-4, 1991.
DLC TA445.5.C673 1992
Road icing, Salting, Chemical ice prevention, Environmental impact, Corrosion, Bridges, Road maintenance, Cost analysis

51-2541
Estimating the life cycle of reinforced concrete decks and marine piles using laboratory diffusion and corrosion data.
Berke, N.S., Hicks, M.C., Corrosion forms and control for infrastructure. ASTM STP 1137. Edited by V. Chaker, Philadelphia, American Society for Testing and Materials, 1992, p.207-231, 32 refs. Presented at a symposium in San Diego, CA, Nov. 3-4, 1991.
DLC TA445.5.C673 1992
Salting, Environmental impact, Corrosion, Bridges, Reinforced concretes, Concrete durability, Concrete admixtures, Weatherproofing

51-2542
Impregnation of concrete with corrosion inhibitors.
Berke, N.S., Dallaire, M.P., Weyers, R.E., Henry, M., Peterson, J.E., Prowell, B., Corrosion forms and control for infrastructure. ASTM STP 1137. Edited by V. Chaker, Philadelphia, American Society for Testing and Materials, 1992, p.300-327, 9 refs. Presented at a symposium in San Diego, CA, Nov. 3-4, 1991.
DLC TA445.5.C673 1992
Salting, Environmental impact, Corrosion, Bridges, Reinforced concretes, Concrete admixtures, Weatherproofing

51-2543
Predicting service life of concrete bridge decks subject to reinforcement corrosion.
Cady, P.D., Weyers, R.E., Corrosion forms and control for infrastructure. ASTM STP 1137. Edited by V. Chaker, Philadelphia, American Society for Testing and Materials, 1992, p.328-338, 19 refs. Presented at a symposium in San Diego, CA, Nov. 3-4, 1991.
DLC TA445.5.C673 1992
Salting, Environmental impact, Bridges, Reinforced concretes, Concrete durability, Corrosion

51-2544
Arctic research of the United States, Vol.10, Fall/Winter, 1996.
U.S. Interagency Arctic Research Policy Committee, Myers, C.E., ed, Haugh, J., ed, Cate, D.W., ed, Valliere, D.R., ed, MP 3962, Arlington, VA, U.S. National Science Foundation, Office of Polar Programs, 1996, 60p., Refs. passim. For selected papers see 51-2545 and 51-2546.
Research projects, Organizations, International cooperation, Regional planning, Meetings, Legislation, Cost analysis

51-2545
Assessment of contaminant risks in the Arctic: pathways and processes that make the Arctic Ocean unique.
Pfirman, S.L., Schlosser, P., Macdonald, R.W., *Arctic research of the United States,* Fall/Winter 1996, Vol.10, p.11-23, 20 refs.
Polar atmospheres, Marine atmospheres, Air pollution, Water pollution, Atmospheric circulation, Ocean currents, Ice cover effect, Nutrient cycle, Marine biology, Physiological effects, Health

51-2546
Framework for assessing the potential health risks of contaminants in the arctic environment.
Layton, D.W., *Arctic research of the United States,* Fall/Winter 1996, Vol.10, p.34-38, 22 refs.
Air pollution, Water pollution, Environmental impact, Health

51-2547
Indicators of climatic and biospheric change: evidence from tree rings.
Jacoby, G.C., D'Arrigo, R.D., Biotic feedbacks in the global climatic system: will the warming feed the warming. Edited by G.M. Woodwell and F.T. Mackenzie, New York, Oxford University Press, 1995, p.108-118, 32 refs.
DLC QC981.8.G56B47 1995
Plant ecology, Plant physiology, Vegetation patterns, Forest lines, Growth, Phenology, Paleobotany, Paleoclimatology, Global warming

51-2548
Permafrost and vegetation response to global warming in North Eurasia.
Velichko, A.A., Borisova, O.K., Zelikson, E.M., Nechaev, V.P., Biotic feedbacks in the global climatic system: will the warming feed the warming. Edited by G.M. Woodwell and F.T. Mackenzie, New York, Oxford University Press, 1995, p.134-156, 23 refs.
DLC QC981.8.G56B47 1995
Plant ecology, Vegetation patterns, Forest lines, Paleobotany, Permafrost distribution, Permafrost thickness, Permafrost indicators, Permafrost forecasting, Active layer, Paleoclimatology, Global warming

51-2549
Biogeochemistry of northern peatlands and its possible responses to global warming.
Gorham, E., Biotic feedbacks in the global climatic system: will the warming feed the warming. Edited by G.M. Woodwell and F.T. Mackenzie, New York, Oxford University Press, 1995, p.169-187, Refs. p.181-187.
DLC QC981.8.G56B47 1995
Peat, Wetlands, Soil chemistry, Soil microbiology, Soil air interface, Biomass, Nutrient cycle, Geochemical cycles, Global warming

51-2550
Methane output from natural and quasinatural sources: a review of the potential for change and for biotic and abiotic feedbacks.
Nisbet, E.G., Ingham, B., Biotic feedbacks in the global climatic system: will the warming feed the warming. Edited by G.M. Woodwell and F.T. Mackenzie, New York, Oxford University Press, 1995, p.188-218, Refs. p.213-218.
DLC QC981.8.G56B47 1995
Hydrates, Clathrates, Natural gas, Permafrost thermal properties, Permafrost forecasting, Frozen ground chemistry, Soil air interface, Global warming

51-2551
Implications of increased solar UV-B for aquatic ecosystems.
Smith, R.C., Biotic feedbacks in the global climatic system: will the warming feed the warming. Edited by G.M. Woodwell and F.T. Mackenzie, New York, Oxford University Press, 1995, p.263-277, Refs. p.273-277.
DLC QC981.8.G56B47 1995
Ozone, Solar radiation, Ultraviolet radiation, Ice edge, Ice cover effect, Marine biology, Algae, Plankton, Photosynthesis, Biomass, Physiological effects
It is suggested that increased solar ultraviolet radiation induced by the antarctic ozone hole, causes a reduction in primary productivity in the phytoplankton of the antarctic marginal ice zone early each austral spring. The current loss in primary productivity is estimated at 2-4%, and though seemingly small, there is concern that the ozone-induced phytoplankton loss may trigger a positive feedback in atmospheric CO_2 that could exacerbate global warming and have a detrimental impact on the whole ecosystem of the southern ocean.

51-2552
Atmospheric CO_2 changes since the last glacial maximum: evidence from the stomatal density record of fossil leaves.
Beerling, D.J., Chaloner, W.G., *Review of palaeobotany and palynology,* Mar. 1994, 81(1), p.11-17, 25 refs.
DLC QE993.R4 1994
Atmospheric composition, Vegetation, Fossils, Ice cores, Antarctica—Vostok Station, Antarctica—Siple Station
It has been shown that a strong negative correlation exists between stomatal density and atmospheric CO_2 concentration in the leaves of deciduous temperate forest trees. This correlation was initially established on a time scale of some 200 years, using dated leaf specimens from herbaria, and confirmed by experimental observations under controlled CO_2 levels. In the present investigation the authors have attempted to combine the use of fossil leaves with the long-term ice core record of CO_2 changes to extend the time scale of stomatal density response to CO_2 change. Stomatal counts were made from fossil leaves of the dwarf willow *Salix herbacea* spanning the last glacial cycle, and the authors are able to demonstrate a reduction in density in response to increased CO_2. This relationship is used to reconstruct the pattern of CO_2 change since the last glacial maximum. The results are compared with the Byrd ice core record from Antarctica. The pattern of CO_2 change in both records is remarkably similar, although there is some mis-match on the dating of certain features of these patterns. It is suggested that this method of CO_2 reconstruction may be developed further to extend the use of sto-

matal density studies to elucidate atmospheric CO_2 trends during earlier critical phases of the Earth's history, long pre-dating the ice core record. (Auth.)

51-2553

Distinguishing internal developmental characteristics from external palaeoenvironmental effects in fossil wood.

Chapman, J.L., *Review of palaeobotany and palynology,* Mar. 1994, 81(1), p.19-32, 33 refs.

DLC QE993.R4 1994

Trees (plants), Fossils, Paleobotany, Paleoecology, Antarctica—Alexander Island

Fossil wood has the potential to record several aspects of the palaeoenvironment in which it grew. Ring width (especially cell number), latewood format, falserings and traumatic tissue are all important morphological characters. Other characters, such as ray dimensions, bark thickness and tracheid or vessel size, are also probably useful but as yet not fully understood. Unfortunately, all these characters vary within a tree depending on position of the wood: twig, branch, trunk, stump or root. It is thus important that the growing position of fossil fragments is identified so that comparisons of wood characters between sites can be made. Fossil examples of characters from woods from the Cretaceous of Antarctica and Alaska provide examples of palaeoenvironmental interpretation. (Auth.)

51-2554

Increased attention to ocean and coastal protection legislation in the 101st Congress.

Bondareff, J., Pittman, L., Coastal zone '91, vol. 1. Proceedings of the Seventh Symposium on Coastal and Ocean Management, Long Beach, CA, July 8-12, 1991. Edited by O.T. Magoon, H. Converse, V. Tippie, L.T. Tobin, and D. Clark, New York, American Society of Civil Engineers, 1991, p.286-300 (Pertinent p.290-291), 38 end notes (refs.); (Pertinent notes: 18, 19, and 20).

DLC HT391.S935 1991 vol.1

Legislation, Environmental protection

For all the grumbling about the ineffectiveness of Congress, the 101st Congress produced a surprising number of critical pieces of coastal- and ocean-related legislation, and began the process of developing other programs. This paper will summarize selected key ocean and coastal environmental bills enacted during the past Congress and analyze what we can expect from the 102nd Congress in the marine environmental area. (Auth.)

51-2555

Strategies for the international stewardship of coastal and marine resources of Antarctica.

Ticco, P.C., Coastal zone '91, vol. 4. Proceedings of the Seventh Symposium on Coastal and Ocean Management, Long Beach, CA, July 8-12, 1991. Edited by O.T. Magoon, H. Converse, V. Tippie, L.T. Tobin, and D. Clark, New York, American Society of Civil Engineers, 1991, p.3530-3540, 15 refs.

DLC HT391.S935 1991 vol.4

Legislation, Environmental protection, Ecosystems, International cooperation

The formulation and realization of several international agreements has successfully governed Antarctica and its surrounding seas for three decades. Today, given the increased real and perceived importance of Antarctica and its resources, it is clear that the next step must be taken, namely, that global scientific inquiry, political initiatives, and the management of antarctic coastal and marine resources must be combined to create and implement a system of wise stewardship. This will be achieved through the use of current international treaties, new agreements, and greater scientific efforts. This paper presents an overview of the many issues associated with the management of antarctic coastal and marine resources; examines the concept of the international stewardship of this global commons; and offers recommendations for future actions.

51-2556

Comments on "On the obscurantist physics of 'form drag' in theorizing about the Circumpolar Current".

Hughes, C.W., Warren, B.A., LaCasce, J.H., Robbins, P.E., *Journal of physical oceanography,* Jan. 1997, 27(1), p.209-212, 16 refs. Includes reply. For pertinent paper see 51-930 or J-56120.

Oceanography, Ocean currents, Atmospheric pressure, Wind factors, Stress concentration, Boundary layer, Friction

In a recent note, Warren et al. presented the opinion that considerations of form drag in the dynamics of the Antarctic Circumpolar Current (ACC) are obscurantist in nature and a distraction from the more promising "Sverdrup" approach to ACC dynamics. The present author argues that, on the contrary, the concept of form drag is one of several important considerations in understanding ACC dynamics and is the one that most clearly distinguishes the ACC from midocean gyres. (Auth. mod.)

51-2557

Pyramidal ice crystal scattering phase functions and concentric halos.

Liu, C., Jonas, P.R., Saunders, C.P.R., *Annales geophysicae,* Nov. 1996, 14(11), p.1192-1197, 30 refs.

Climatology, Radiation balance, Cloud physics, Light scattering, Ice crystal optics, Ice crystal structure, Orientation, Wave propagation, Light effects, Models, Statistical analysis

51-2558

Heat-transfer and defrosting characteristics of a horizontal array of cooled tubes immersed in a very shallow fluidized bed.

Aihara, T., Ohara, T., Shimoyama, T., Kitano, H., *International journal of heat and mass transfer,* May 1997, 40(8), p.1807-1815, 26 refs.

Pipes (tubes), Heat transfer coefficient, Heat pumps, Defrosting, Ice solid interface, Ice cover effect, Frost protection, Simulation, Wind tunnels, Fluid dynamics, Coatings, Particles, Ice erosion

51-2559

Seasonal and annual change in seawater temperature, salinity, nutrient and chlorophyll *a* distributions around South Georgia, South Atlantic.

Whitehouse, M.J., Priddle, J., Symon, C., *Deep-sea research I,* Apr. 1996, 43(4), p.425-443, 37 refs.

Oceanographic surveys, Marine biology, Biomass, Hydrography, Water chemistry, Nutrient cycle, Plankton, Ecosystems, Chlorophylls, Seasonal variations, Sampling, Statistical analysis, Sea ice, Sea water, —South Georgia

51-2560

Nonequilibrium effect of anisotropic interface kinetics on the directional growth of ice crystals.

Nagashima, K., Furukawa, Y., *Journal of crystal growth,* Feb. 1997, 171(3-4), p.577-585, 17 refs.

Ice physics, Ice crystal growth, Anisotropy, Solutions, Ice crystal structure, Ice microstructure, Orientation, Dendritic ice, Supercooling, Ice water interface, Temperature effects

51-2561

Growth and reproductive phenology of nine intertidal algae on the Murman coast of the Barents Sea.

Shoshina, E.V., Makarov, V.N., Voskoboĭnikov, G.M., Van den Hoek, C., *Botanica marina,* Mar. 1996, 39(2), p.83-93, 28 refs.

Marine biology, Subpolar regions, Ecosystems, Shores, Littoral zone, Algae, Growth, Phenology, Vegetation patterns, Sampling, Biomass, Statistical analysis, Seasonal variations, Barents Sea

51-2562

Man-made snow.

Brown, R., *Scientific American,* Jan. 1997, 276(1), p.119.

Artificial snow, Snow manufacturing, Ice nuclei, Snow composition, Snow density, Bacteria, Admixtures

51-2563

Late-glacial vegetation and environment on the eastern slope foothills of the Rocky Mountains, Alberta, Canada.

Mandryk, C.A.S., *Journal of paleolimnology,* July 1996, 16(1), p.37-57, Refs. p.54-57.

Pleistocene, Paleoecology, Limnology, Paleoclimatology, Vegetation patterns, Palynology, Lacustrine deposits, Sedimentation, Stratigraphy, Radioactive age determination, Geochronology, Landscape development, Canada—Alberta

51-2564

Story of interstellar dust—from dust to dust.

Greenberg, J.M., *South African journal of science,* Sep. 1996, 92(9), p.416-419.

Ice physics, Cosmic dust, Extraterrestrial ice, Porous materials, Ice sublimation, Models, Geochemistry

51-2565

Direction of exploration for hydrocarbons in Jurassic sediments on the Russian shelf of the Barents Sea.

Zakharov, E.V., IUnov, A.IU., *Petroleum geology,* Jan.-Feb. 1995, 29(1-2), p.32-36, Translated from Geologiia nefti i gaza.

Oceanography, Hydrocarbons, Marine deposits, Marine geology, Hydrocarbons, Natural gas, Exploration, Reservoirs, Barents Sea

51-2566

Organic carbon in the boreal spring flood from adjacent subcatchments.

Bishop, K., Pettersson, C., *Environment international,* 1996, 22(5), Nordic Symposium on Humic Substances in Soil and Water, 5th, Lund, Sweden, June 6-8, 1995. Selected papers, p.535-540, 11 refs.

Snow hydrology, Snowmelt, Meltwater, Sediment transport, Hydrogeochemistry, Watersheds, Runoff, Stream flow, Flooding, Seasonal variations, Hydrography, Isotope analysis

51-2567

Chamber for laboratory studies of atmospheric aerosols and clouds.

Narus, M.L., Schoenfelder, N.C., Na, Y., Chavasse, L.A., Disselkamp, R.S., *Review of scientific instruments,* Dec. 1996, 67(12), p.4364-4368, 16 refs.

Climatology, Air pollution, Polar stratospheric clouds, Aerosols, Cloud physics, Sampling, Cloud chambers, Design, Simulation, Infrared spectroscopy

A stainless-steel chamber has been constructed and interfaced to a Fourier transform infrared spectrometer for the purpose of studying laboratory simulated atmospheric aerosols and clouds applicable to the atmospheres of both polar regions. The chamber is cylindrical in design and is comprised of a double-walled inner assembly that resides within an outer vacuum jacket. The chamber described here has been used to examine heterogeneous chemistry of solid powder samples. (Auth. mod.)

51-2568

Quaternary and glacial geology.

Ehlers, J., Chichester, England, John Wiley & Sons, 1996, 578p., Translation of Allgemeine und historische Quartärgeologie. Refs. p.457-547.

DLC QE696.E2813 1996

Glacial geology, Glaciation, Glacial erosion, Glacial deposits, Quaternary deposits, Periglacial processes, Marine geology, Geological surveys, Stratigraphy, Geochronology, Paleoclimatology

51-2569

Past glacial environments: sediments, forms and techniques.

Menzies, J., ed, Glacial environments, Vol.2, Oxford, England, Butterworth-Heinemann Ltd., 1996, 598p., Refs. p.487-568.

DLC QE697.P38 1995

Glaciation, Glacial geology, Glacial erosion, Glacial deposits, Marine geology, Geological surveys, Stratigraphy, Geochronology, Paleoclimatology

51-2570

Determination of the saline soils creep parameters in Yamal Peninsula.

Aksenov, V.I., Afonin, A.P., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.1, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.444-449, 5 refs.

DLC TC1665.I5793a 6th V.1 1996

Saline soils, Sands, Frozen ground strength, Frozen ground compression, Soil creep, Soil tests, Russia—Yamal Peninsula

51-2571

Depression of soil moisture freezing point and relationships for native and compact soils.

Fedorov, V.I., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.1, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.465-468, 2 refs.

DLC TC1665.I5793a 6th V.1 1996

Soil freezing, Frost penetration, Frozen ground temperature, Frozen ground thermodynamics, Soil compaction, Soil pressure, Soil water, Freezing points

51-2572

Proceedings. Vol.2.

International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996, Chung, J.S., ed, Sayed, M., ed, Hobbs, R.E., ed, Yoerger, D.R., ed, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, 481p., Refs. passim. For selected papers see 51-2573 through 51-2607.

DLC TC1665.I5793a 6th V.2 1996

Offshore structures, Bridges, Piers, Ice solid interface, Ice cover strength, Ice loads, Ice pressure, Ice friction, Ice deformation

51-2573

Transmission pipeline system for development of Shtockmanovskoye gas field in the Barents Sea.

Kamyshev, M.A., Vermeulen, H.R., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.41-47, 4 refs.

DLC TC1665.I5793a 6th V.2 1996

Natural gas, Gas production, Gas wells, Offshore drilling, Gas pipelines, Pipe laying, Cold weather operation, Barents Sea

51-2574

Sediment transport and morphological changes caused by underwater pipeline in the Kara Sea.

Beloshapkova, S.G., Beloshapkov, A.V., Leont'ev, I.O., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.105-110, 5 refs.

DLC TC1665.I5793a 6th V.2 1996

Gas pipelines, Underground pipelines, Pipe laying, Ocean bottom, Trenching, Earth fills, Soil stabilization, Subsea permafrost, Permafrost preservation, Ice scoring, Shore erosion, Sediment transport, Russia—Kara Sea, Russia—Baydaratskaya Bay

51-2575

Numerical simulation of irregular temperature field around shallow pipe in soil medium.

Budkowska, B.B., Kreja, I., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.119-125, 21 refs.

DLC TC1665.I5793a 6th V.2 1996

Hot oil lines, Underground pipelines, Permafrost beneath structures, Permafrost heat transfer, Permafrost preservation, Ground thawing, Thaw depth, Soil stabilization, Mathematical models

51-2576

Mechanism analysis and dynamic simulation of iced cable galloping.

Fan, Q.S., Guan, F., Zhao, K.M., Wu, H.Y., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.224-227, 9 refs.

DLC TC1665.I5793a 6th V.2 1996

Power line icing, Ice loads, Cables (ropes), Wind pressure, Damping, Mathematical models

51-2577

Compressive strength of natural sea ice in horizontal loading.

Lehmus, E., Kärnä, T., Tanabe, A., Yoshizawa, M., Ishibashi, Y., Sackinger, W., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.285-290, 18 refs.

DLC TC1665.I5793a 6th V.2 1996

Sea ice, Ice structure, Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice cracks, Strain tests

51-2578

Model of viscoplastic deformation of frozen and unfrozen soils and ice.

Zaretskiĭ, IU.K., Fish, A.M., MP 3963, International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.291-296, 23 refs.

DLC TC1665.I5793a 6th V.2 1996

Rheology, Plastic deformation, Frozen ground strength, Frozen ground compression, Soil strength, Soil creep, Ice strength, Ice pressure, Ice plasticity, Ice deformation, Ice creep, Mathematical models

A mathematical model for visco-plastic deformations, a new criterion for the long-term strength of frozen and unfrozen soils, and a criterion for the long-term (creep) strength of ice were developed on the basis of a combination of compression and torsion constant-deformation-rate tests, and relaxation tests. The analysis of test data on the kinetics of the generation and development of microdefects in the structure of ice during creep made it possible to formulate a generalized criterion for the creep strength of ice. Physical interpretation and a quantitative evaluation procedure are presented of the anomalous behavior of ice under high confining pressure, when its strength reaches a maximum, then gradually decreases with continued pressure increase. These studies allowed the temperature effect on the viscoplastic flow and the long-term strength of frozen soils and ice under high pressures to be taken into account as well.

51-2579

Mechanical properties of dry saline ice rubble.

Cornett, A.M., Timco, G.W., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.297-303, 11 refs.

DLC TC1665.I5793a 6th V.2 1996

Salt ice, Ice cover strength, Ice pileup, Pressure ridges, Ice loads, Ice pressure, Ice friction, Ice deformation, Strain tests, Environmental tests

51-2580

Numerical technique in calculation of dynamic interaction forces between ice floe and arctic offshore structures.

Choi, K.S., Rim, C.W., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.304-310, 18 refs.

DLC TC1665.I5793a 6th V.2 1996

Offshore structures, Ice solid interface, Ice cover strength, Ice loads, Ice pressure, Ice friction, Ice deformation, Ice breaking

51-2581

Indentation contact and penetration of ice by a semicircular indentor.

Veitch, B., Tuhkuri, J., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.311-316, 28 refs.

DLC TC1665.I5793a 6th V.2 1996

Ice solid interface, Ice cover strength, Ice loads, Ice pressure, Ice friction, Ice deformation, Ice cutting, Ice breaking, Penetration tests, Computerized simulation

51-2582

Impact of ice loads on pile structures.

Sasajima, T., Kawai, K., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.317-322, 15 refs.

DLC TC1665.I5793a 6th V.2 1996

Offshore structures, Hydraulic structures, Pile structures, Ice solid interface, Ice loads, Ice pressure, Ice friction, Ice control, Ocean waves, Impact tests, Japan—Hokkaido, Okhotsk Sea

51-2583

Answers to some questions on the new method for sheet ice force estimation.

Arunachalam, A.V.M., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.323-332, 24 refs.

DLC TC1665.I5793a 6th V.2 1996

Bridges, Piers, Ice solid interface, Ice cover strength, Ice loads, Ice pressure, Ice friction, Ice deformation, Stress concentration, Impact tests, Penetration tests, Computerized simulation

51-2584

Sea ice compression and dynamic response in local observation in the Arctic Ocean.

Smirnov, V.N., Sheĭkin, I.B., Shushlebin, A.I., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.333-339, 12 refs.

DLC TC1665.I5793a 6th V.2 1996

Drift stations, Drift, Ice floes, Air ice water interaction, Ice cover strength, Ice loads, Ice friction, Ice pressure, Ice deformation

51-2585

Program of experimental study of the three-dimensional ice strength distribution for ice force analysis.

Bekker, A.T., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.340-342, 8 refs.

DLC TC1665.I5793a 6th V.2 1996

Offshore structures, Ice solid interface, Ice cover strength, Ice loads, Ice pressure, Ice friction, Ice deformation

51-2586

Determination of the ice strength for calculation of the ice load.

Bekker, A.T., Gomol'skiĭ, S.G., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.343-345, 4 refs.

DLC TC1665.I5793a 6th V.2 1996

Offshore structures, Ice solid interface, Ice cover strength, Ice loads, Ice friction, Ice pressure, Ice deformation

51-2587

Method of slowing of ice cover growth.

Gavrilo, V.P., Kovalev, S.M., Lebedev, G.A., Sukhorukov, K.K., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.346-348, 6 refs.

DLC TC1665.I5793a 6th V.2 1996

Ice growth, Ice heat flux, Ice control, Ice prevention, Artificial melting, Thermal insulation

51-2588

Nonlinear loading phase in ice indentation.

Kärnä, T., Sippola, M., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.349-353, 17 refs.

DLC TC1665.I5793a 6th V.2 1996

Offshore structures, Artificial islands, Ice solid interface, Ice cover strength, Ice loads, Ice pressure, Ice friction, Ice deformation, Ice breaking, Penetration tests, Mathematical models

51-2589

Experimental investigations of relaxation properties of sea ice internal stresses.

Sukhorukov, K.K., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.354-361, 10 refs.

DLC TC1665.I5793a 6th V.2 1996

Drift stations, Ice floes, Ice cover strength, Ice loads, Ice pressure, Ice relaxation, Ice deformation, Ice cracks, Ice breakup, Stress concentration, Chukchi Sea, Antarctica—Weddell Sea

Studies on relaxation of internal stressses in sea ice and breakup of ice floes were conducted from the North Pole-30 drift station in the Chukchi Sea in spring 1990, and from the Weddell-1 drift station in the Weddell Sea in spring 1992. It was found that the relaxation time was 21 hours both in the Arctic when an ice crack was 150 m long and the ice was 3 m thick, and in the Antarctic when an ice crack was 75 m long and the ice was 1.5 m thick, that is, the relaxation time was the same for both when the crack was 50 times longer than the ice thickness. Observations in the Weddell Sea indicate that the relaxation time can be approximated by dividing the crack length by the ice thickness, taking the square root of that ratio, and multiplying by three.

51-2590

Numerical modeling of the creep behaviour of ice-debris mixtures under variable thermal regimes.

Azizi, F., Whalley, W.B., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.362-366, 8 refs.

DLC TC1665.I5793a 6th V.2 1996

Rock glaciers, Glacier flow, Talus, Ground ice, Fossil ice, Slope processes, Frozen ground temperature, Soil creep, Ice creep

51-2591

Ice loads on the Northumberland Strait bridge piers—an approach.

Brown, T.G., Croasdale, K.R., Wright, B., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.367-372, 18 refs.

DLC TC1665.I5793a 6th V.2 1996

Bridges, Piers, Ice conditions, Ice solid interface, Ice loads, Ice pressure, Pressure ridges, Ice pileup, Ice control, Canada—Northumberland Strait

51-2592

Northumberland Strait crossing project acceptance criteria for ice loads and load factors.

Buckland, P.G., Leal, A.J., Gagnon, D.P., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.373-379.

DLC TC1665.I5793a 6th V.2 1996

Bridges, Piers, Ice loads, Ice pressure, Ice friction, Foundations, Soil strength, Design criteria, Canada—Northumberland Strait

51-2593

Ice features and ice mechanical properties in Northumberland Strait.

Williams, F.M., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.390-397, 14 refs.

DLC TC1665.I5793a 6th V.2 1996

Bridges, Piers, Ice solid interface, Ice cover strength, Ice loads, Ice pressure, Ice pileup, Pressure ridges, Drift, Canada—Northumberland Strait

51-2594

Structure of hummocks offshore of northern Sakhalin.

Beketskiĭ, S.P., Astaf'ev, V.N., Truskov, P.A., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.398-400, 2 refs.

DLC TC1665.I5793a 6th V.2 1996

Fast ice, Pressure ridges, Hummocks, Ice pileup, Ice loads, Ice pressure, Offshore structures, Russia—Sakhalin Island

51-2595

Monitoring ice movement in Antarctica.

Thiel, K.H., Wu, X.Q., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.401-405, 6 refs.

DLC TC1665.I5793a 6th V.2 1996

Glacier surveys, Ice shelves, Glacier surfaces, Glacier thickness, Glacier flow, Crevasses, Topographic surveys, Synthetic aperture radar, Spaceborne photography, Antarctica—Hemmen Ice Rise

Monitoring the changes of the ice cover and the movement of the ice in the remote antarctic region continuously is quite difficult. ERS SAR Interferometry provides a tool to perform this task. For the region around Hemmen Ice Rise (HIR)it is demonstrated, that topography, tidal variations and horizontal movements of shelf ices can be estimated. A number of SAR images obtained by ERS-1 satellite in three day time intervals are used in the experiment. The evaluated topography is in good agreement with the topographic map. The differential interferometry has been used to estimate the tidal changes between the data acquistions. A horizontal movement map of the ice surface around the HIR on the Antarctic was obtained by using the displacements in azimuth and slant range involved in the interferogram together with the given tidal heights. The combination of two interferograms from ascending and descending orbits with different look angles allows for accurate determination of the motion of the shelf ice around HIR. Also the width change of the crevasses on the shelf ice for a three day interval can be determined. (Auth. mod.)

51-2596

Freeze-up and ice movement effects: Kara Sea—fall 1994.

Fett, R.W., Englebretson, R.E., Kozo, T.L., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.406-410, 12 refs.

DLC TC1665.I5793a 6th V.2 1996

Radioactive wastes, Water pollution, Freezeup, Ice growth, Drift, Ice surveys, Ice detection, Ice composition, Impurities, Radar tracking, Radiometry, Spaceborne photography, Russia—Kara Sea

51-2597

Evidence for autumn sea ice transport through the Vil'kitskogo Strait at the eastern exit of the Kara Sea.

Kozo, T.L., et al, International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.411-416, 16 refs.

DLC TC1665.I5793a 6th V.2 1996

Radioactive wastes, Water pollution, Air ice water interaction, Drift, Impurities, Ice forecasting, Wind factors, Russia—Kara Sea, Russia—Laptev Sea, Russia—Vil'kitskiy Strait

51-2598

Icewatch—ice SAR monitoring of the Northern Sea Route.

Johannessen, O.M., Sandven, S., Melent'ev, V.V., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.417-421, 6 refs.

DLC TC1665.I5793a 6th V.2 1996

Ice surveys, Ice reporting, Ice detection, Ice forecasting, Ice routing, Ice navigation, Synthetic aperture radar, Radar tracking, Spaceborne photography, Northern Sea Route

51-2599

Global sea ice monitoring from microwave satellites.

Johannessen, O.M., Miles, M.W., Bjørgo, E., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.422-426, 14 refs.

DLC TC1665.I5793a 6th V.2 1996

Ice surveys, Sea ice distribution, Ice conditions, Ice edge, Ice detection, Global warming, Radio echo soundings, Radiometry, Spaceborne photography

The most direct sources of consistent, repetitive information on the polar sea ice covers are satellite passive microwave sensors. Previous studies using microwave data have detected decreases in arctic ice extent and ice area, but no significant changes in the Antarctic. The authors analyzed microwave data 1978-1995, to identify changes in ice extent, ice area, and overall ice concentration. They found continued decreases in the arctic ice extent and ice area, as well as a decrease in the overall ice concentration. Also included is a seasonal analysis of the arctic ice cover, which reveals the greatest decreases to be in summer. The relatively large summer decreases imply a reduction in the multi-year ice area, suggesting reduced ice thickness. These findings have considerable implications for global warming and are important for polar operations. (Auth. mod.)

51-2600

Sea-ice runway near McMurdo Station, Antarctica: a problem of logistics.

Barthelemy, J.L., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.427-432, 5 refs.

DLC TC1665.I5793a 6th V.2 1996

Ice runways, Ice roads, Ice cover strength, Ice deterioration, Trafficability, Logistics, Road maintenance, Antarctica—McMurdo Station

The annual sea-ice runway at McMurdo Station allows heavy-haul wheeled aircraft to operate at the start of a short but vital re-supply season. A top priority of the United Stated Antarctic Program is to optimize research productivity by ushering scientists and equipment to the continent at the earliest possible date, thus a key operational objective is to extend usage of the seasonal runway for as long a period as is safe and reasonable. In the best of years, air operations are not relocated to a subordinate ski facility until after the ice runway is abandoned because of progressive bottom melting and surface deterioration. During other years, however, the wheeled facility closes prematurely due to a failure at one of two vulnerable transition areas. The VXE-6 transition links the ice road that originates at the runway with the land-based road system around McMurdo Station proper. All priority cargo carried from the runway must cross this transition. The Williams Field transition occurs at the edge of the Ross Ice Shelf where annual sea ice abuts the glacial outcroppings. When the seasonal runway is closed, buildings are towed across the transition to a new location at the ski way. Failure of either of these two vital links is tantamount to failure of the runway itself. (Auth. mod.)

51-2601

Abrasion rate of various materials due to the movement of ice sheets.

Hanada, M., Ujihira, M., Hara, F., Saeki, H., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.433-437, 5 refs.

DLC TC1665.I5793a 6th V.2 1996

Offshore structures, Bridges, Piers, Concrete structures, Masonry, Ice solid interface, Ice loads, Ice pressure, Ice friction, Abrasion

51-2602

Underwater arctic transport system.

Pavlenko, V., Tsagareli, D.V., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.438-440, 7 refs.

DLC TC1665.I5793a 6th V.2 1996

Marine transportation, Petroleum transportation, Economic development, Subglacial navigation, Submarines, Tanker ships, Northern Sea Route

51-2603

Hydrodynamic and ice model of the south-western part of the Kara Sea.

Arkhipov, B.V., Sol'bakov, V.V., Tsvetsinskiĭ, A.S., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.441-446, 13 refs.

DLC TC1665.I5793a 6th V.2 1996

Gas pipelines, Underground pipelines, Ice conditions, Ice cover thickness, Ice heat flux, Ice forecasting, Water temperature, Salinity, Computerized simulation, Russia—Kara Sea, Russia—Baydaratskaya Bay

51-2604

Technical aspects of marine seismic survey in ice covered regions.

Buravtsev, V.IU., Jokat, W., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.447-449, 6 refs.

DLC TC1665.I5793a 6th V.2 1996

Seismic surveys, Oceanographic surveys, Bottom topography, Bottom sediment, Ocean bottom, Earth crust, Ice cover effect, Subglacial observations, Ice acoustics, Underwater acoustics

51-2605

Sea-ice observations at the north-eastern Sakhalin shelf and a thermodynamic modelling of first-year sea ice.

Aota, M., Shirasawa, K., Truskov, P.A., Polomoshnov, A.M., Michukov, V., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.450-454, 3 refs.

DLC TC1665.I5793a 6th V.2 1996

Ice surveys, Fast ice, Sea water freezing, Air ice water interaction, Snow ice interface, Ice conditions, Ice cover thickness, Ice heat flux, Ice forecasting, Mathematical models, Russia—Sakhalin Island

51-2606

Experimental research on ice load.

Cai, Z.R., Pen, Y.H., Men, X.Y., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.455-458, 5 refs.

DLC TC1665.I5793a 6th V.2 1996

Bridges, Piers, River ice, Ice breakup, Ice jams, Ice solid interface, Ice loads, Ice pressure, Ice friction, Damping, China—Songhua River

51-2607

Design of hull structures for ice-navigating ships.

Shemendiuk, G.P., Babtsev, V.A., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.459-463, 5 refs.

DLC TC1665.I5793a 6th V.2 1996

Icebreakers, Ships, Ice navigation, Ice solid interface, Ice loads, Metal ice friction, Design criteria

51-2608

Composition and origin of volcanic ash zones in Late Quaternary sediments from the Reykjanes Ridge: evidence for ash fallout and ice-rafting.

Lackschewitz, K.S., Wallrabe-Adams, H.J., *Marine geology,* Jan. 1997, 136(3-4), p.209-224, Refs. p.223-224.

Oceanography, Pleistocene, Marine geology, Quaternary deposits, Marine deposits, Ice rafting, Glacial erosion, Sediment transport, Volcanic ash, Sampling, Geochemistry, Atlantic Ocean

51-2609

Mineralogy and lithostratigraphy of Harris Lake, southwestern Saskatchewan, Canada.

Last, W.M., Sauchyn, D.J., *Journal of paleolimnology,* 1993, 9(1), p.23-39, 41 refs.

Limnology, Salinity, Lacustrine deposits, Quaternary deposits, Watersheds, Hydrogeochemistry, Sedimentation, Lithology, Stratigraphy, Mineralogy, Sampling, Geochronology, Canada—Saskatchewan—Harris Lake

51-2610

Latest Cretaceous flora of northeastern Russia and the "Terminal Cretaceous Event" in the Arctic.

Herman, A.B., Spicer, R.A., *Paleontological journal,* Sep. 1995, 29(2A), p.22-35, Translated from Paleontologicheskiĭ zhurnal. With Russian summary. 26 refs.

Pleistocene, Subpolar regions, Paleobotany, Paleoecology, Vegetation patterns, Quaternary deposits, Sampling, Classifications, Plant tissues, Global change, Russia—Kamchatka Peninsula

51-2611

Glacial burst overwhelms Skeidará.

Carlowicz, M., *Eos,* Nov. 19, 1996, 77(47), p.470.

River flow, Glacial hydrology, Lake bursts, Floodplains, Flooding, Geothermal thawing, Meltwater, Subglacial drainage, Geomorphology, Iceland—Skeidará

51-2612

Algal and bacterial processes in platelet ice during late austral summer.

Grossmann, S., Lochte, K., Scharek, R., *Polar biology,* Oct. 1996, 16(8), p.623-633, Refs. p.632-633.

Sea ice, Algae, Biomass, Bacteria, Marine biology, Antarctica—Weddell Sea

The biota inhabiting layers of platelet ice were investigated in the Weddell Sea during late austral summer. Due to meltwater release, the salinity of the interstitial water between platelets was reduced. Algae and bacteria accumulated within this ice environment attaining concentrations of up to 500 μg in total pigments (chlorophyll *a* plus phaeopigments) and 2 mg in bacterial biomass per liter. Pennate diatoms of the genus *Fragilariopsis* were most common in the platelet layer, while ice-free water was dominated by autotrophic nanoflagellates. Protozoa contributed only 5% or less to the total protistan (microalgae plus protozoa) cell concentration in the ice, compared to about 10% in open water, thus suggesting a low grazing pressure within the platelet habitat. The bulk of bacterial biomass occurred within the dense assemblages of pennate diatoms that grew attached to the ice platelets. Algal and bacterial concentrations in the interstitial water between platelets were much lower. Measurements of bacterial growth showed that substantial heterotrophic potential can be established within assemblages inhabiting late summer platelet ice. (Auth. mod.)

51-2613

In-flight calibration of NOAA AVHRR visible and near-IR bands over Greenland and Antarctica.

Loeb, N.G., *International journal of remote sensing,* Feb. 1997, 18(3), p.477-490, 10 refs.

Reflectivity, Albedo, Ice sheets, Radiation measuring instruments, Spaceborne photography

A new method for in-flight calibration of NOAA AVHRR visible and near-IR bands is presented. The approach involves using calibrated NOAA-9 near-nadir reflectances over spatially and temporally uniform ice-surfaces from Greenland and Antarctica to produce reflectance calibration curves for AVHRR instruments in all orbits. The reflectance calibration curves consist of second order polynomial regressions of reflectance on solar zenith angle, derived from observations that are spatially uniform in all AVHRR channels over subregions of area 68 km by 68 km. By comparing reflectances from uncalibrated AVHRR instruments with these calibration curves, new channel 1 and 2 calibration coefficients are obtained with an accuracy of ≈5%. The main advantages of this calibration method are: calibration targets are large; it can be applied over multiple years; and it is applicable for a wide range of solar zenith angles, and can therefore be used year-round. (Auth. mod.)

51-2614

Discrimination of sea ice in the Labrador marginal ice zone from synthetic aperture radar image texture.

Collins, M.J., Livingstone, C.E., Raney, R.K., *International journal of remote sensing,* Feb. 1997, 18(3), p.535-571, 36 refs.

Ice surveys, Sea ice distribution, Ice conditions, Ice edge, Ice water interface, Ice detection, Synthetic aperture radar, Backscattering, Spaceborne photography, Image processing, Labrador Sea

51-2615

Conference proceedings of the Italian Research on Antarctic Atmosphere, Vol.51.

Colacino, M., ed, Giovanelli, G., ed, Stefanutti, L., ed, Italian Research on Antarctic Atmosphere, 6th Workshop, Florence Nov. 6-8, 1995, Bologna, Italian Physical Society, 1996, 383p., Refs. passim. For individual papers see E-56815, F-56812 through F-56814, I-56795 through I-56811, I-56816 through I-56826, K-56827, K-56828 or 51-2616 through 51-2629.

Meteorological data, Meteorological instruments, Low temperature research, Research projects, Ozone, Weather observations, Stratosphere, Glaciology, Ice air interface

This is a collection of papers presented at the 6th Workshop of Italian Research on Antarctic Atmosphere, held Nov. 6-8, 1995, in Florence, Italy. It consists of 34 reports divided into 5 sections: 8 papers dealing with physics of the planetary boundary layer; 6 on meteorology and climatology; 7 on radiation, aerosols and clouds; 6 on physics and chemistry of the stratosphere; and 7 on instruments and measurement methodologies.

51-2616

Study of the annual atmospheric cycle in the sector 90°E-180°E, East Antarctica.

Pettré, P., Murphy, B., Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.51, Bologna, Italian Physical Society, 1996, p.3-10, 9 refs.

Weather observations, Low temperature research, Atmospheric circulation, Climatic changes, Sea ice distribution, Ice air interface, Wind factors, Antarctica—East Antarctica

The authors report on their study of the modulation of the annual atmospheric cycle in the Southern Hemisphere which is based upon a governing idea: the main observed modification concerns the Semi-Annual Oscillation of pressure which dominates the general circulation of the atmosphere in the high southern latitudes. The project's three main fields of investigation are discussed: the meridional temperature gradient through the mean troposphere between 60°S and 50°S; the effects of sea ice; and the large scale katabatic feedback.

51-2617

Boundary layer field experiment in the area of Terranova Bay, during the summer 1994-95.

Viola, A., et al, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.51, Bologna, Italian Physical Society, 1996, p.11-23, 14 refs.

Atmospheric circulation, Wind factors, Meteorological instruments, Ice sheets, Glaciers, Ice air interface, Antarctica—Reeves Névé, Antarctica—Nansen Ice Sheet

To study the characteristics of the air flow in a confluence region, 2 measurement stations have been set up in the area of Terra Nova Bay during the summer 1994-95: one on the Reeves Névé (at 1200 m ASL) and another on the Nansen Ice Sheet. Both stations were equipped with a triaxial Doppler sodar and with several fast response sensors to evaluate the characteristics of the turbulent fluxes over a complex orographic area. In this work, the description of the experiment is given, and a first attempt to correlate different sensor measurements at the Nansen Ice Sheet station is presented. Good agreement is found between the wind measurements obtained by sodar and sonic anemometers. The differences recorded in the sonic anemometer and sodar momentum flux estimates need further investigation. (Auth.)

51-2618

Some characteristics of turbulence from summertime measurements over an antarctic ice sheet.

Giostra, U., Cava, D., Cardillo, F., Tagliazucca, M., Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.51, Bologna, Italian Physical Society, 1996, p.25-38, 16 refs.

Atmospheric disturbances, Atmospheric circulation, Wind factors, Meteorological instruments, Snow air interface, Heat flux, Antarctica—Victoria Land

Turbulence measurements were made by fast response instrumentation over the ice sheet of a coastal region in Victoria Land during the summer of 1993-94. Turbulent fluxes of momentum, heat and water vapor were determined by the eddy correlation method. Daily cycle of some relevant turbulence quantities were investigated to determine the mean seasonal characteristics of the atmospheric boundary layer. It is prevalently stably stratified, the averaged heat flux is always negative and latent heat flux is positive but exchange processes are of limited extent being mostly inhibited by the low level of turbulence. Relevant deviations from this behavior were observed during katabatic wind episodes and free convection events. In the first case it is observed that the boundary layer stratification tends to become more neutral, temperature, downward heat and upward water vapor fluxes increase notably, and energy is stored inside the snow. Unstable thermal stratification occurs only in 15% of cases; it is concentrated in the central hours of the day and often a rapid transition to free convection is observed. Sporadic cases were also observed in late evening and early morning hours. (Auth.)

51-2619

Surface energy and radiation balances in Antarctica.

Georgiadis, T., et al, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.51, Bologna, Italian Physical Society, 1996, p.39-44, 4 refs.

Radiation balance, Wind factors, Climatic factors, Heat transfer, Glaciers, Clouds (meteorology), Meteorological instruments, Antarctica—Reeves Glacier

An experiment on surface energy and radiation balances was conducted during the 10th Italian expedition at the Reeves Glacier to correlate the surface balances with the formation and development of katabatic winds and to define the microclimatology of the site. An 'eddy-correlation' station equipped also with radiometers, thermocouples and a soil heat flux sensor recorded the radiative and energy components. The first analysis of the data showed a low amount of sensible and latent heat partition of the net radiation (few tens of W/m^2). The main process which gains the major amount of the available surface energy is the heat transfer through the subsurface medium (up to 80% of the net radiation value). The role of the cloud cover in triggering the surface balances is discussed, comparing situations of clear and cloudy skies. (Auth.)

51-2620

Can the marine organic matter evidenced in antarctic snow be responsible of biogeochemical fractionation in marine aerosol?

Cini, R., et al, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.51, Bologna, Italian Physical Society, 1996, p.211-227, 30 refs.

Air water interactions, Aerosols, Atmospheric circulation, Snow composition, Impurities, Chemical analysis, Oceanography, Models, Antarctica—McCarthy Ridge, Antarctica—Styx Glacier

Previous findings of marine organic surfactant matter in antarctic snow, lead the authors to consider a biogeochemical fractionation of marine aerosol. They propose a new simplified model based on the distribution of marine surfactant adsorption layer on the surface of spray drops (SDALM) which are originated during th breaking wave events. Field conditions and laboratory experiments seem to explain, according to SDALM, the anomalous enrichment of K and Ca in marine aerosol found in antarctic snow at altitudes higher than 700 m above sea level. The application of SDALM could suggest a new general approach to the variations in the composition of the marine aerosol fine fraction. (Auth.)

51-2621

Fractionating phenomena, altitude induced, on snow composition in northern Victoria Land (Antarctica).

Piccardi, G., Becagli, S., Traversi, R., Udisti, R., Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.51, Bologna, Italian Physical Society, 1996, p.229-245, 17 refs.

Snow composition, Aerosols, Atmospheric composition, Atmospheric circulation, Air water interactions, Chemical analysis, Sea water, Antarctica—Victoria Land

Chemical analysis of snow and firn samples, collected from snow pits and coring at different altitudes, has revealed fractionating phenomena of the atmospheric aerosol and has identified principal and secondary sources of some environmental components. Using sodium as sea spray source indicator and methanesulphonic acid as biogenic marine tracer, it has been possible to evaluate the altitude contribution and the size of aerosol particles on the snow composition and on the progressive importance of fractionating phenomena. As the elevation of the station increases (and the particle size decreases) evidence of secondary sources of K, Ca and non-sea-salt sulphates has been noted. The dating of the snow layers sampled has shown the seasonal character of the principal and secondary sources of some of the components studied. (Auth.)

51-2622

Observation of liquid particles at -65° in a polar cirrus.

Del Guasta, M., et al, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.51, Bologna, Italian Physical Society, 1996, p.247-252, 10 refs.

Clouds (meteorology), Polar atmospheres, Ice crystal nuclei, Atmospheric composition, Lidar

Theoretical and laboratory studies confirm that pure water cannot exist as a liquid below about -40°. Liquid droplets have seldom been observed in cirrus clouds at about -50°C. The LIDAR technique can help find unusual supercooled clouds when the depolarization technique is implemented: the presence of non-depolarizing layers in a cloud is indicative of a very special scattering media; scattering particles must have a symmetry axis oriented along the laser beam. This is possible either with spherical droplets or ice plates horizontally oriented. In this work, a -65°C non-depolarizing cloud observed in a polar region is studied, indicating that supercooled droplets are responsible for the absence of depolarization in most of the cloud. This is the coldest supercooled cirrus ever observed. (Auth. mod.)

51-2623

Studies of reactive and reservoir chlorine and nitrogen in the antarctic stratosphere, using ground-based observations.

Keys, J.G., Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.51, Bologna, Italian Physical Society, 1996, p.269-278, 15 refs.

Ozone, Atmospheric composition, Stratosphere, Experimentation, Antarctica—Arrival Heights

A review is given of antarctic ground-based measurements of stratospheric trace gases that are relevant to ozone depletion studies. Techniques and important results from these experiments are discussed. Emphasis is given to those experiments that have been conducted by NIWA, alone or in cooperation with the international partners. The principal stratospheric components that are discussed here are nitrogen and chlorine compounds, which have a special relevance in ozone depletion chemistry in Antarctica. Studies of extended time series of the column amounts of these molecules give insight into the heterogeneous chemical processes that dominate the antarctic springtime destruction of ozone. (Auth.)

51-2624

Airborne Polar Experiment (APE): state of the art.

Stefanutti, L., MacKenzie, R., Balestri, S., Adriani, A., Borrmann, S., Khattatov, V., Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.51, Bologna, Italian Physical Society, 1996, p.279-284, 2 refs.

Research projects, Polar stratospheric clouds, Aerosols, Ozone, Meteorological instruments

An airborne campaign to investigate the role of Polar Stratospheric Clouds (PSCs) and background aerosols in the ozone depletion processes is reported. By means of the stratospheric aircraft M-55 Geophysika (Myasishchev Design Bureau), equipped with *in-situ* and remote sensing instrumentation, a more detailed study of the microphysics and chemistry of PSCs will be possible. The main stages of the project are described. (Auth. mod.)

51-2625

In situ observations of aerosol and Polar Stratospheric Clouds by balloon-borne and airborne laser backscatter sondes.

Adriani, A., et al, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.51, Bologna, Italian Physical Society, 1996, p.285-292, 7 refs.

Polar stratospheric clouds, Meteorological instruments, Aerosols, Stratosphere, Antarctica—McMurdo Station

Two balloon-borne devices for optical probing of the atmosphere are described: one is able to measure optical properties of stratospheric aerosols, the other is capable of assessing their dimensional distribution. Compared results are reported. A third airborne device, still under development, is also presented. (Auth.)

51-2626

Lidar observation of PSCs in the Arctic and Antarctic.

Stefanutti, L., et al, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.51, Bologna, Italian Physical Society, 1996, p.293-309, 12 refs.

Polar stratospheric clouds, Aerosols, Lidar, Meteorological data, Models, Antarctica—Dumont d'Urville Station

Polar Stratospheric Clouds and aerosols were monitored in Antarctica and in the Arctic from 1989 to 1995 and include the pre-Pinatubo, the Pinatubo and after-Pinatubo period. Non-depolarizing PSCs and warm depolarizing aerosols are discussed. Non-depolarizing PSCs have been observed over Dumont d'Urville Station during the POLE experiment (1989-1995) and over Sodankyla during SESAME. (Auth. mod.)

51-2627

Brewer measurements in Ushuaia austral springs 1994-1995.

Rafanelli, C., Valenti, C., Di Menno, M., Luttazzi, C., Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.51, Bologna, Italian Physical Society, 1996, p.319-325, 6 refs.

Ozone, Meteorological instruments, Meteorological data, Ultraviolet radiation

Preliminary results, obtained during two ozone-measurement campaigns in austral springs of 1994 and 1995, are presented. Methods and instruments used are described. Data analysis shows that during the austral spring the ozone hole has a duration of about 15 days; the UV radiation measurements show an increase of erythemal irradiance during the hole's duration. (Auth. mod.)

51-2628

Ocular hazard from side-scattered radiation by cirrus and polar stratospheric clouds.

Guzzi, D., Stefanutti, L., Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.51, Bologna, Italian Physical Society, 1996, p.335-341, 5 refs.

Ozone, Polar stratospheric clouds, Lidar, Atmospheric composition, Meteorological instruments, Radiation, Physiological effects

A link at high latitudes between ozone losses and the conversion of inorganic chlorine toward reactive forms, by means of polar stratospheric clouds (PSC), is discussed. An airborne campaign for the study of the PSCs is proposed: a high-flying research aircraft, the Geophysica (M-55), would provide the platform for making the measurements at heights between 7 and 22 km; a Lidar would be used to study particle size distribution and shape. Since the Lidar would be placed in front of the pilot at a distance of about 200 cm from the cockpit, the possibility of damage to the pilot's eyes from the side-scattered laser radiation is considered.

51-2629

Atmospheric CO_2 concentration measured continuously from the Mediterranean to the Bellingshausen Sea: technology and methodology.

Ori, C., Giovanelli, G., Lenaz, R., Colombo, T., Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.51, Bologna, Italian Physical Society, 1996, p.361-367, 7 refs.

Low temperature research, Meteorological instruments, Atmospheric composition, Antarctica—Bellingshausen Sea

This paper describes the methodology used during the EOLO 94 cruise for continuous CO_2 measurement in a hemispheric course. The SIEMENS ULTRAMAT 5E analyzer was mounted in a thermostatic box fitted on shock-absorbing supports; a two-stage freezing unit, that could go below -55°C and sustain measuring operations for at least 5 to 24 hours depending on humidity percentage, was assembled. Twenty minutes were sufficient for the replacement of the trap when the air flow was obstructed by the ice from frozen humidity. The very low temperature was reached by using a two-stage refrigerator system: the first, a traditional compressor unit (to -30°C); the second, a big Peltier cell able to lower the temperature to -55°C. The actual working temperature of the two systems was monitored by a real time data logger. (Auth.)

51-2630

Summary of inorganic water quality sampling in the Fairbanks Railroad Industrial Area, Fairbanks, Alaska: 1994-1995.

Vohden, J., *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Public-data file,* Dec. 1995, No.95-21, 8p., 3 refs.

Wells, Ground water, Water pollution, Water chemistry, Hydrogeochemistry, Urban planning, United States—Alaska—Fairbanks

51-2631

Low-temperature thermal history of three wells in southern Alaska offshore basins: lower Cook Inlet, Shelikof Strait and Stevenson Trough.

Murphy, J.M., Clough, J.G., *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Public-data file,* Dec. 1995, No.95-23, 77p., 36 refs.

Exploration, Offshore drilling, Well logging, Marine deposits, Ocean bottom, Bottom sediment, Geothermometry, Geochronology, Soil dating, Radioactive age determination, Paleoclimatology, United States—Alaska—Cook Inlet, United States—Alaska—Shelikof Strait, United States—Alaska—Kodiak Island

51-2632

Climatic and environmental controls of cryogenic landslides, Yamal, Russia.

Leĭbman, M.O., Egorov, I.P., International Symposium on Landslides, 7th, Trondheim, Norway, June 17-21, 1996. Proceedings, Rotterdam, A.A. Balkema, 1996, p.1941-1946, 18 refs.

Active layer, Ground thawing, Solifluction, Landslides, Mudflows, Slope processes, Slope stability, Avalanche formation, Avalanche forecasting, Russia—Yamal Peninsula

51-2633

Thin ice: international environmental cooperation in the Arctic.

Samson, P., Wellington, New Zealand, Pacific Press, 1997, 176p., Refs. p.142-157.

International cooperation, Regional planning, Environmental protection

51-2634

Recco: what should we think about it. [Recco: que faut-il en penser]

Sivardière, F., *Neige et avalanches,* Dec. 1996, No.76, p.2-5,32, In French with English summary. 2 refs.

Avalanches, Accidents, Rescue equipment, Radio beacons

51-2635

Avalanche forecast in France. 1. Balance sheet. [La prévision du risque d'avalanche en France. 1. Bilan]

Pahaut, E., Giraud, G., *Neige et avalanches,* Dec. 1996, No.76, p.6-11,32, In French with English summary. 8 refs.

Avalanche forecasting, Snow cover stability, Weather forecasting, Warning systems, Data transmission, Safety, France

51-2636

Balance sheet of the avalanche accidents during the 1995-1996 year in France. [Bilan des avalanches 1995-96]

Sivardière, F., *Neige et avalanches,* Dec. 1996, No.76, p.24-27,32, In French with English summary.

Avalanches, Accidents, France

51-2637

Natural sludge dewatering. I: combination of freezing, thawing, and drying as dewatering methods.

Hellström, D., Kvarnström, E., *Journal of cold regions engineering,* Mar. 1997, 11(1), p.1-14, 22 refs.

Sludges, Water treatment, Waste treatment, Sewage disposal, Artificial freezing, Artificial thawing, Freeze drying, Sweden

51-2638

Natural sludge dewatering. II: thawing-drying process in full-scale sludge freezing ditches.

Hellström, D., *Journal of cold regions engineering,* Mar. 1997, 11(1), p.15-29, 10 refs.

Sludges, Water treatment, Waste treatment, Sewage disposal, Artificial freezing, Artificial thawing, Freeze drying, Sweden

51-2639

Core-based SCB fracture of aligned first-year sea ice (phases III and IV).

Adamson, R.M., Shapiro, L.H., Dempsey, J.P., *Journal of cold regions engineering,* Mar. 1997, 11(1), p.30-44, 29 refs.

Sea ice, Core samplers, Ice microstructure, Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice cracks, Ice breaking, Strain tests

51-2640

Core-based SCB fracture of aligned first-year sea ice (phase VI).

LeClair, E.S., Adamson, R.M., Dempsey, J.P., *Journal of cold regions engineering,* Mar. 1997, 11(1), p.45-58, 13 refs.

Sea ice, Core samplers, Ice structure, Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice cracks, Ice breaking, Strain tests

51-2641

Mechanical properties of first-year sea ice at Tarsiut Island.

Blanchet, D., Abdelnour, R., Comfort, G., *Journal of cold regions engineering,* Mar. 1997, 11(1), p.59-83, 32 refs.

Artificial islands, Caissons, Ice pileup, Ice cover strength, Ice loads, Ice pressure, Ice elasticity, Ice deformation, Stress concentration, Stress strain diagrams, Mathematical models, Beaufort Sea

51-2642

Mechanical properties of first-year sea ice at Tarsiut Island—Discussion.

Croasdale, K.R., *Journal of cold regions engineering,* Mar. 1997, 11(1), p.89-93, 11 refs. For paper under discussion see 51-2641.

Artificial islands, Ice pileup, Ice cover strength, Ice loads, Ice pressure, Ice deformation, Beaufort Sea

51-2643

Mechanical properties of first-year sea ice at Tarsiut Island—Discussion and closure.

Richter-Menge, J.A., Schulson, E.M., MP 3964, *Journal of cold regions engineering,* Mar. 1997, 11(1), p.93-98, 31 refs. For paper under discussion see 51-2641.

Artificial islands, Ice cover strength, Ice loads, Ice pressure, Ice elasticity, Ice deformation, Stress concentration, Strain tests, Beaufort Sea

51-2644

Activity and experience report on the avalanche warning service in Bavaria, winter 1994/95.

[Tätigkeits- und Erfahrunsbericht über den Lawinenwarndienst in Bayern, Winter 1994/95], Munich, Bayerisches Landesamt für Wasserwirtschaft (Bavarian Regional Office for Water Management), 1996, 107p., In German.

Avalanche forecasting, Avalanches, Accidents, Safety, Snow depth, Snowfall, Air temperature, Germany

51-2645

Determination of the flow behaviour of bitumens and polymer-modified bitumens at low temperatures. [Ansprache des Fließverhaltens von Bitumen und polymermodifizierten Bitumen bei tiefen Temperaturen]

Schellenberg, K., Eulitz, H.J., *Forschung Straßenbau und Straßenverkehrstechnik,* 1995, No.695, 95p., In German with extended English and shorter French summary. 20 refs.

Bitumens, Polymers, Viscosity, Viscous flow, Viscoelasticity, Low temperature tests, Strain tests

51-2646

Effects of ice boom geometry on ice capture efficiency.

Gooch, G., SR 96-17, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Sep. 1996, 9p., ADA-318 968, 10 refs.

Ice booms, Ice jams, Design, Design criteria, Ice cover, River ice, Ice formation

An ice boom's geometry is critical to the collection and retention of ice in small, fast-moving streams and rivers. Ice booms are designed to quickly form a solid ice cover much earlier than the ice cover would form naturally. Once formed, the ice cover insulates the river, eliminating the production of frazil ice locally. Frazil leads to thick ice deposits, which reduce the river's available flow area and contribute to midwinter and spring flooding. Model experiments, conducted at the Ice Engineering Facility at the Cold Regions Research and Engineering Laboratory, have varied the ice boom geometry to speed up the process of ice cover formation. Model simulations have used floating plastic beads to simulate real ice particles to determine what ice boom design works best. Under controlled laboratory conditions, boom geometry clearly affects the boom's ability to capture more beads. Comparison of field and laboratory tests indicates similar results.

51-2647

Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility.

Bigl, S.R., Berg, R.L., SR 96-20, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Sep. 1996, 37p., ADA-319 640, 17 refs.

Pavements, Design, Design criteria, Cold weather tests, Compaction, Grain size, Hydraulics, Unfrozen water content, Frost resistance, Subgrades, Frost penetration

The U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) conducted various laboratory tests on pavement materials from the Mn/ROAD facility. The tests helped to characterize the behavior of materials under season frost conditions, and to provide input necessary for modeling the materials with the Mechanistic Pavement Design and Evaluation Procedure under development at CRREL. This report describes test results that define the physical characteristics, such as grain size, specific gravity, Atterberg limits, organic content, and compaction, as well as hydraulic properties, such as moisture retention and hydraulic conductivity, frost susceptibility, and unfrozen moisture content of two subgrade samples and two base materials from Mn/ROAD.

51-2648

Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure.

Bigl, S.R., Berg, R.L., SR 96-21, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Sep. 1996, 42p., ADA-319 596, 25 refs.

Pavements, Design, Design criteria, Cold weather performance, Bitumens, Frost resistance, Subgrades, Frost penetration, Thaw depth, Frost heave, Water table, Damage

The U.S. Army Cold Regions Research and Engineering Laboratory is developing a mechanistic pavement design procedure for use in seasonal frost areas. The procedure was used to predict pavement performance of some test sections at the Mn/ROAD facility. Simulations were conducted in three phases, investigating the effects on predictions of water table position, subgrade characteristics, asphalt model, and freeze season characteristics. The procedure predicted significantly different performance by the different test sections and highly variable results depending on the performance model applied. The simulated performance of the test sections also was greatly affected by the subgrade conditions, e.g., density, soil moisture, and water table depth. In general, predictions for the full-depth asphalt sections indicate that they will not fail due to cracking, but two of the three criteria for subgrade rutting indicate failure before the five- or 10-year design life of the sections. Conventional sections are predicted not to fail due to subgrade rutting; however, sections including the more frost-susceptible bases in their design are predicted to fail due to asphalt cracking relatively early in their design life, and sections with non-frost-susceptible bases are predicted to fail towards the end of the design life.

51-2649

Dredging in an active artillery impact area; Eagle River Flats, Alaska.

Walsh, M.R., Chamberlain, E.J., Henry, K.S., Garfield, D.E., Sorenson, E., SR 96-22, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Sep. 1996, 45p., ADA-318 812, 17 refs.

Sediments, Dredging, Explosives, Military facilities, Environmental impact, Water pollution, Soil pollution, Land reclamation, United States—Alaska—Eagle River Flats, United States—Alaska—Fort Richardson

Remediation of sediments in permanently ponded areas at Eagle River Flats, a salt marsh contaminated with white phosphorus (WP), may require dredging. Because the Flats were used as a firing range impact area for over 40 years by the U.S. military, there is much unexploded ordnance, which will require that any dredging equipment be remotely controlled. To treat the sediment pumped from dredged areas, a spoils retention basin was designed, constructed, and tested. This basin contains several innovations, including a natural remediation of the WP. The dredging system was deployed in Oct. of 1994, with sampling indicating that WP-contaminated areas were removed from the dredging area. An early snowfall curtailed operations shortly after initiation.

51-2650

Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum.

Palazzo, A.J., Zang, P., Duell, R.W., Cary, T.J., Hardy, S.E., SR 96-24, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Sep. 1996, 9p., ADA-319 796, 10 refs.

Grasses, Plant physiology, Growth, Countermeasures, Cold weather performance

Mowing is one of the more expensive operations in managing roadside and other low-maintenance turfgrass areas. The objective of this study was to evaluate the performance of two plant growth regulators (PGRs)—mefluidide (Embark) and imidazolinone (Event)—in reducing the development of seedheads and inhibiting the vertical growth (plant height) of mixed turf swards at multiple sites over a two-year period. Mefluidide applied at the manufacturer's recommended rate (2.3 L/ha or 2 pints/acre) provided the best general control of plant height and seedhead development compared to mefluidide at lower rates or imidazolinone at both recommended and lower rates or a combination of mefluidide and imidazolinone at lower rates. Within the control areas (no PGR), plant height did not correlate with plant weight. Therefore, the timing of treatments is critical since increases in plant height and weight occur at different times during the spring. At the early May application time, mefluidide applied at the recommended rate inhibited both plant height and weight. The effects of this treatment on plant growth were similar in most of the eight sites tested. However, PGR performance was affected by the presence of earlier maturing grasses in the sward, microclimatic factors, and broadleaf weeds. There was no difference in the effectiveness of the treatments when the materials were applied again during the following season. Despite some variation in its effect, the mefluidide treatment at the recommended rate was consistent enough among all test locations, turf species, and microclimates to recommend using this technique in the demonstration stage of the trial.

51-2651

State of the art of modeling millimeter-wave remote sensing of the environment.

O'Neill, K., SR 96-25, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Oct. 1996, 27p., ADA-319 226, Refs. p.22-26.

Remote sensing, Scattering, Computer programs, Computerized simulation, Models

A survey was undertaken of models for millimeter-wave (MMW) scattering and emission from environmental features, particularly in the vicinities of 35 and 94 GHz. The ultimate objective was to identify models suitable for current or near-future application in scene generation. The ideal model would be based on first principles, would be readily available in facilitated software, and would have reasonable requirements in terms of computational resources and input parameters. At MMW frequencies, these requirements push the frontiers of current science and technology. In most applications, one must accept as a first approximation the approaches currently under development in research settings. This report reviews the basic methods and approaches underlying all available models in terms of volume scattering, treatment of surfaces and transitions, and the development of statistical quantities from rational physics. Very rough surfaces, locally steep surface slopes, and low-angle incidence can rarely be treated entirely successfully, but recent developments offer the prospect of significant progress. Volume and combined surface-volume scattering and emission models are reviewed for application to land, water, vegetation, snow, and ice environments. Most are essentially works in progress, with theory and validation currently building from earlier work at C and X bands. Very sound capabilities are available for treatment of common atmospheric features, with recent progress in modeling more complex meteorological events. Limiting consideration to truly available codes, a list is provided for each of the above areas of models and their sources. Because it is the most comprehensive and is currently facilitated in terms of software, the MIT EMSARS model is the foremost candidate to serve as a platform for future addition and development.

51-2652

Further studies on the softening of rigid PVC by aqueous solutions of organic solvents.

Parker, L.V., Ranney, T.A., SR 96-26, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Oct. 1996, 22p., ADA-319 436, 15 refs.

Well casings, Polymers, Solutions

In this study, small pieces of PVC well casing were exposed to relatively low activities (or relative solubilities) of TCE and methylene chloride for 12 months. PVC pieces were also exposed to aqueous solutions containing several organic chemicals that were either solvents or swelling agents of PVC. In addition, small pieces of PVC were exposed to aqueous solutions containing organic chemicals that were either PVC solvents or swelling agents and were totally miscible in water. These studies revealed that there is an interactive effect among these chemicals when dissolved in water. However, softening does not appear to occur in any solutions where the sum of the relative solubilities is less than 0.1.

51-2653

Comprehensive report: investigation of airfield construction in arctic and subarctic regions. Appendix 6. Design and construction studies, Fairbanks Research Area.

U.S. Army Corps of Engineers. St. Paul District, MN, Jan. 1948, 89p. + photos + plates.

Runways, Airports, Site surveys, Permafrost surveys, Permafrost beneath roads, Permafrost beneath structures, Permafrost preservation, Thermal insulation, Cold weather construction, United States—Alaska—Fairbanks

51-2654

Aircraft ground de/anti-icing fluid holdover time field testing program for the 1992-1993 winter.

D'Avirro, J., Chan, G., Cleary, C., Foo, H., *Transport Canada. Transportation Development Centre, Montreal. Publication,* Oct. 1993, TP 11836E, 122p. + appends., With French summary.

Aircraft icing, Chemical ice prevention, Ice detection, Cold weather tests, Environmental tests, Safety

51-2655

Arctic tanker risk analysis project. Phase I.

Loughnane, D.V.F., *Transport Canada. Transportation Development Centre, Montreal. Publication,* June 1993, TP 11540E, 2 vols., With French summary. Vol.1: main report, 232p. Vol.2: appends., 200p. Over 600 refs. passim in both vols.

Tanker ships, Icebreakers, Accidents, Oil spills, Water pollution, Ice navigation, Ice routing, Route surveys, Human factors, Environmental protection, Safety

51-2656

Generation of an aircraft ice sensor data base and evaluation of de/anti-icing fluids. Appendixes B and C.

Nolan, C., ed, Inkpen, S., ed, *Transport Canada. Transportation Development Centre, Montreal. Publication,* Sep. 1993, TP 11810E, Var. p., With French summary. Appendix B consists of a report and attachments by J.L. Laforte and P. Louchez and Appendix C consists of a report by M.M. Oleskiw, both on the Clean Wing Detection System (CWDS) to detect ice and deicing fluids on aircraft.

Aircraft icing, Ice detection, Chemical ice prevention, Temperature measurement, Moisture detection, Warning systems

51-2657

Arctic tanker risk analysis. Phase II.

Loughnane, D.V.F., et al, *Transport Canada. Transportation Development Centre, Montreal. Publication,* Oct. 1994, TP 12325E, 2 vols., With French summary. Vol.1: main report, 143p. Vol.2: appends., 242p. Approx. 180 refs.

Tanker ships, Accidents, Oil spills, Ice navigation, Route surveys, Human factors, Labor factors, Safety, Cost analysis

51-2658

Second generation ice navigation system implementation, Phase III.

Gautier, C., Marton, C.G., *Transport Canada. Transportation Development Centre, Montreal. Publication,* Sep. 1993, TP 11794E, 45p., With French summary.

Ships, Ice navigation, Ice routing, Ice reporting, Radar tracking, Synthetic aperture radar, Image processing, Data transmission, Computerized simulation

51-2659

Commander's guide to cold weather operations. *U.S. Marine Corps. Fleet Marine Force Reference Publication,* 1988, FMFRP 7-24, Var. p.

Cold weather operation, Cold weather survival, Military operation, Manuals

51-2660

Small-unit leader's guide to cold weather operations. *U.S. Marine Corps. Fleet Marine Force Reference Publication,* 1988, FMFRP 7-23, Var. p.

Cold weather operation, Cold weather survival, Military operation, Manuals

51-2661

Basic field manual: operations in snow and extreme cold. *U.S. War Department (now Department of Defense). Field manual,* 1941, FM 31-15, 82p.

Cold weather operation, Cold weather survival, Military operation, Manuals

51-2662

Fluid, aircraft deicing/anti-icing, non-Newtonian, (pseudoplastic), SAE types II, III, and IV. *Society of Automotive Engineers. Aerospace material specification,* Oct 1996, SAE AMS 1428A, 72p., Refs. passim. Supersedes AMS 1428 of Jan. 1993.

Aircraft icing, Chemical ice prevention, Ice removal, Cold weather tests, Viscosity, Standards

51-2663

Deicing/anti-icing fluid, aircraft, SAE Type I. *Society of Automotive Engineers. Aerospace material specification,* Oct 1996, SAE AMS 1424A, 72p., Refs. passim. Supersedes AMS 1424 of Jan. 1993.

Aircraft icing, Chemical ice prevention, Ice removal, Cold weather tests, Standards

51-2664

SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan.

Moritz, R.E., ed, Perovich, D.K., ed, MP 3966, *University of Washington, Seattle. Applied Physics Laboratory. Polar Science Center. Arctic System Science Ocean-Atmosphere-Ice Interactions ARCSS/OAII report,* July 1996, No.5, 60p., Refs. p.49-54.

Research projects, Drift stations, Polar atmospheres, Atmospheric circulation, Ocean currents, Air ice water interaction, Ice heat flux, Heat balance, Global warming, Computerized simulation

51-2665

Developing new low-temperature admixtures for concrete: a field evaluation.

Korhonen, C.J., Charest, B.A., Romisch, K., MP 3967, Corps of Engineers Structural Engineering Conference, Aug. 28-30, 1995, San Antonio, TX. Vol.1, Washington, D.C., U.S. Army Corps of Engineers, Directorate of Engineering and Construction, 1996, p.535-545, 7 refs.

Concrete freezing, Winter concreting, Concrete admixtures, Concrete placing, Concrete curing, Concrete strength, Frost protection, Antifreezes

Two new admixtures, capable of preventing water from freezing and increasing the hydration rate of cement at below-freezing temperatures, were field-tested at Sault Ste. Marie, MI. Concrete made with the admixtures was placed on a frozen subgrade during a cold winter day and was allowed to cure thermally unprotected in the cold. Comparison to control concrete placed inside a heated shelter showed that the unprotected admixtured concrete was equal to control concrete in strength and appearance. Work is continuing on the development of these admixtures for commercialization.

51-2666

Improvements to snow load design criteria.

Tobiasson, W., MP 3968, Corps of Engineers Structural Engineering Conference, Aug. 28-30, 1995, San Antonio, TX. Vol.2, Washington, D.C., U.S. Army Corps of Engineers, Directorate of Engineering and Construction, 1996, p.1181-1189, 6 refs.

Snow loads, Snow depth, Snow accumulation, Snowfall, Military facilities, Statistical analysis, Design criteria, Building codes, Standards, Manuals

American Society of Civil Engineers (ASCE) Manual 7, "Design Loads for Buildings and Other Structures," is the resource document for Army Technical Manual (TM) 5-809-1, "Structural Design Criteria, Loads" (U.S. Department of the Army, 1992). ASCE Manual 7 is updated every 5 years and is to be reissued in 1995, after which, TM 5-809-1 will be withdrawn. The new Manual 7 will include updated site-specific snow load information gathered by the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) from military installations. All design values will be determined statistically based on measurements rather than as at present, some determined by local practice with no indication which is which. Where local practice values differ, they will be indicated in parentheses.

51-2667

Shallow insulated foundations for pre-engineered metal buildings.

Danyluk, L.S., Khosrownia, G., MP 3969, Corps of Engineers Structural Engineering Conference, Aug. 28-30, 1995, San Antonio, TX. Vol.2, Washington, D.C., U.S. Army Corps of Engineers, Directorate of Engineering and Construction, 1996, p.1213-1223, 9 refs.

Buildings, Foundations, Footings, Frost penetration, Frost protection, Thermal insulation, Cold weather construction, Military facilities, Building codes

For building construction projects in the cold regions of the world, depth of frost penetration has been a major factor in the expense and design difficulty of foundations. Often, deep foundations are used in areas of deep seasonal frost, but in some instances a deep foundation creates problems with the design of a building. Such is the case in metal buildings, whose selection as a building system is primarily due to function, speedy construction, and economy. These same characteristics are what make a shallow foundation design an attractive alternative over a conventional deep foundation. For three decades, the Scandinavian countries have researched, developed, and implemented shallow insulated foundations (SIF). However, their use in the United States is still new and somewhat limited. Most U.S. building codes require footings to be placed below the expected depth of frost. In recognition of the potential of shallow insulated foundations, research is being performed by various universities, private industries, and government agencies, including the U.S. Army Cold Regions Research Engineering Laboratory, in an effort to better understand the SIF system and to recommend changes in U.S. building codes to allow for its use and implementation. A large laundry/changing facility to be built for toxic chemical disposal personnel at the Umatilla Army Depot in Hermiston, OR, is described.

51-2668

Proceedings of the NIPR Symposium on Polar Meteorology and Glaciology, No.10.

Watanabe, O., ed, NIPR Symposium on Polar Meteorology and Glaciology, 18th, Tokyo, July 18-19, 1995, Tokyo, National Institute of Polar Research, 1996, 174p., Refs. passim. For selected papers see C-56846, F-56834 through F-56837, F-56839, F-56840, F-56845, F-56847, I-56838, I-56841 through I-56844 or 51-2669 through 51-2679.

Glaciology, Meteorological data, Sea ice, Snow, Air ice water interaction, Engineering, Antarctica—Showa Station, Antarctica—Mizuho Station

This is a collection of papers presented at the 18th Symposium on Polar Meteorology and Glaciology held in Tokyo on July 18-19, 1995. It consists of 14 full-length papers and 21 abstracts; the former were refereed and are arranged in the order of scientific areas of glaciology, meteorology and physical oceanography.

51-2669

Structure and dielectric properties of surface snow along the traverse route from coast to Dome Fuji Station, Queen Maud Land, Antarctica.

Shiraiwa, T., Shoji, H., Saito, T., Yokoyama, K., Watanabe, O., NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.10, Tokyo, National Institute of Polar Research, 1996, p.1-12, 20 refs.

Snow electrical properties, Snow cover structure, Snow stratigraphy, Dielectric properties, Grain size, Antarctica—Queen Maud Land

Stratigraphic observations were carried out on the surface snow from the coast to the ice divide at Dome Fugi in the summer of 1994-95, to provide microwave remote sensing with ground truth data. Stratification, grain size and dielectric properties were measured in 1 m-deep snow pits. The dry snow zone of the studied area is divided into three parts: a region of compacted snow and solid-type depth hoar (1000 to 2000/2300 m a.s.l.), where spatial and vertical distribution of various snow properties are uniform; a region of wind-packed snow and skeleton-type depth hoar (2000/2300 to 3500 m), which is characterized by spatial alteration of the glazed surface and the stratified depth hoar layer; and a region of interbedded skeleton- and solid-types depth hoar (higher than 3500 m) where the seasonal stratification of snow is characterized by thin-hard summer and thick-soft winter layers. (Auth. mod.)

51-2670

Snow surface features along the traverse route from the coast to Dome Fuji Station, Queen Maud Land, Antarctica.

Furukawa, T., Kamiyama, K., Maeno, H., NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.10, Tokyo, National Institute of Polar Research, 1996, p.13-24, 15 refs.

Sastrugi, Snow surface, Snow accumulation, Bedrock, Topographic surveys, Glaze, Wind factors, Antarctica—Queen Maud Land

Frequencies of snow surface features such as sastrugi, dunes and thermal cracks were measured along the traverse route from the coastal region to Dome Fuji. The route is divided into 3 regions: the coastal region, characterized by high frequency of small sastrugi and low frequency of dunes; the katabatic wind region, characterized by the co-existence of small and large sastrugi, dunes and glazed surface; and the inland region, characterized by low frequencies of small sastrugi and dunes. These regional characteristics of snow surface features reflect the deposition-erosion process affected by surface topography of the ice sheet. A glazed surface zone, where snow accumulation is small, develops on steep slopes above the large convex bedrock topography. This indicates that bedrock topography is one of the factors controlling snow accumulation patterns in the katabatic wind region on the antarctic ice sheet. (Auth.)

51-2671

Measurements of the complex permittivity of acid-doped ice from 1 kHz to 30 MHz: new data set for developing ice radar and dielectric analysis of ice cores.

Matsuoka, K., Fujita, S., Matsuoka, T., Ishida, T., Hondoh, T., Mae, S., NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.10, Tokyo, National Institute of Polar Research, 1996, p.25-35, 16 refs.

Dielectric properties, Ice composition, Experimentation, Radio echo soundings, Ice cores

The authors measured the complex permittivity of pure and acid (HCl, HNO_3 and H_2SO_4)-doped ice from 1 kHz to 30 MHz and from -9°C to -33°C. The complex permittivity of acid-doped ice is assumed to depend linearly on the concentration. The frequency and temperature dependence of the relationship between the complex permittivity and the acid concentration are investigated. The tendency of dielectric dispersion of acid-doped ice is discussed. A simple calculation shows that the reflection coeficient due to acidity change in the HF band in ice sheets increases with decreasing frequency. The effect of permittivity changes and loss tangent changes due to acidity changes to reflection coefficient are quantitatively shown, respectively. As a result, a data set which is essential to develop HF ice radar, and to compare radar echoes and ice core signals is established. (Auth.)

51-2672

Volcanic records and dating of the upper half of the H15 ice core from Mizuho Plateau, East Antarctica.

Kohno, M., Fukuoka, T., Fujii, Y., Kusakabe, M., NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.10, Tokyo, National Institute of Polar Research, 1996, p.36-54, Refs. p.52-54.

Ice dating, Aerosols, Atmospheric composition, Ice models, Electrical resistivity, Antarctica—Queen Maud Land

Two closely-spaced peaks of electrical conductivity were found at depths between 45 and 50 m of the 120-m long ice core drilled at site H15 in Antarctica by JARE-32 in 1991. Chemical analysis of the core revealed that the ice layers were characterized by high acidity and high sulfate concentration suggesting volcanic signals. In order to identify these characteristics, the core was dated using two methods: counting the number of high electrical conductivity peaks resulting from seasonal variations of SO_4^{2-} and NO_3^-, and an empirical model of firn densification. The dating results suggest that the high conductivity is related to deposition of acidic aerosols from the volcanic eruptions of Tambora in 1815 and of an unknown volcano in 1809. (Auth.)

51-2673

Variations of the CO_2, CH_4 and N_2O concentrations and $\delta^{13}C$ of CO_2 in the glacial period deduced from an antarctic ice core, south Yamato.

Machida, T., Nakazawa, T., Narita, H., Fujii, Y., Aoki, S., Watanabe, O., NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.10, Tokyo, National Institute of Polar Research, 1996, p.55-65, Refs. p.64-65.

Paleoclimatology, Climatic changes, Atmospheric composition, Ice cores, Ice composition, Antarctica—Queen Fabiola Mountains

To reconstruct variations of atmospheric greenhouse gases in the glacial period, air in an ice core recovered from a bare ice field in the Queen Fabiola Mountains was extracted and the CO_2, CH_4 and N_2O concentrations, and $\delta^{13}C$ of CO_2, were analyzed. The CO_2, CH_4 and N_2O concentrations were lower than the pre-industrial Holocene values, suggesting that this ice core was formed in the glacial period. The variations of the CO_2, CH_4 and N_2O concentrations during the glacial period showed a good correlation with that of $\delta^{18}O$ of ice from the core. The CO_2 concentrations varied almost opposite in phase with $\delta^{13}C$, which implies that CO_2 with isotopically light carbon was added to or subtracted from the atmosphere in the glacial period. (Auth.)

51-2674

Formation mechanism of plate-like ice crystals growing in air at low temperature and low supersaturation.

Gonda, T., Matsuura, Y., Wada, M., NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.10, Tokyo, National Institute of Polar Research, 1996, p.66-72, 12 refs.

Ice crystal growth, Experimentation, Measuring instruments, Air temperature

The supersaturation dependences on the slope of growth hillocks formed on the face P_p and the face P_B of ice crystals grown in air at -28.5°C and low supersaturation were measured to study the formation mechanism of plate-like ice crystals growing under this condition. It was found that both faces of plate-like ice crystals grown at -28.5°C and low supersaturation grew by the Burton-Cabrera-Frank (BCF) mechanism, and when the relationship $P_p > P_B$ held, plate-like ice crystals grew. (Auth.)

51-2675

Diffusion coefficient and solubility measurements of noble gases in ice crystals.

Satoh, K., Uchida, T., Hondoh, T., Mae, S., NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.10, Tokyo, National Institute of Polar Research, 1996, p.73-81, 8 refs.

Ice cores, Experimentation, Ice crystals, Ice composition, Gases, Instruments, Antarctica—Mendenhall Peak

Diffusion coefficients and solubility of helium, neon and argon gases in ice crystals were determined by measuring the pressure rise in a vessel caused by gas emission from an ice sample supersaturated with the gas. Diffusion coefficients of helium, neon and argon gases in the temperature range between 258.2 K and 268.2 K were on the order of 10^{-9} m^2/s, 10^{-10} m^2/s and 10^{-11} m^2/s, respectively. Solubilities of helium and neon gases in the molar fraction deduced from the total amount of emitted gases were on the order of 10^{-6} and 10^{-7}, respectively. As the diffusion coefficients of noble gases were found to depend on their molecular radii, the diffusion coefficients of air molecules, such as nitrogen and oxygen, in ice were estimated. (Auth.)

51-2676

Methanesulfonate and non-sea-salt sulfate in drifting-snow from east Queen Maud Land, East Antarctica.

Osada, K., NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.10, Tokyo, National Institute of Polar Research, 1996, p.111-118, 32 refs.

Snow composition, Seasonal variations, Aerosols, Air pollution, Atmospheric composition, Atmospheric circulation, Antarctica—Queen Maud Land, Antarctica—Mizuho Station

Drifting-snow samples were collected at Mizuho Station from Feb. to Sep. 1986, and along traverse routes in eastern Queen Maud Land from Oct. 1986 to Jan. 1987. Variability in the methanesulfonate (MSA) and non-sea-salt (nss) SO_4^{2-} concentration levels suggests a seasonal relationship: high in summer and low in winter. The ratios of $nssSO_4^{2-}$/MSA concentrations show a weak inverse seasonal relationship. The concentration levels of $nssSO_4^{2-}$ correlate well with MSA concentration levels in the Mizuho Station samples, suggesting that the dominant source of the $nssSO_4^{2-}$ and MSA deposited in this region is marine biogenic dimethylsulfide. The $nssSO_4^{2-}$/MSA ratios from the traverse samples are significantly higher and deviate widely from the Mizuho Station regression line, implying a non-biogenic natural source for the $nssSO_4^{2-}$ at higher-elevation inland locations. (Auth.)

51-2677

Interannual variability of sea ice conditions in Syowa Station sector deduced from DMSP SSM/I data.

Enomoto, H., Warashina, H., Saito, T., Shiraiwa, T., NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.10, Tokyo, National Institute of Polar Research, 1996, p.119-126, 15 refs.

Sea ice distribution, Ice cover thickness, Meteorological data, Periodic variations, Meteorological factors, Maps, Antarctica—Showa Station

This paper focuses on the interannual variability of sea-ice conditions in spring and summer in the vicinity of Showa Station. Sea ice extent and concentration are discussed using DMSP SSM/I satellite passive microwave data. Persistent high ice concentration was observed in Dec. in 1989 and 1993; the sea ice was formed earlier (Apr.-May) and expanded rapidly in this initial stage. The sea ice concentrations were higher throughout the winter season during these years. Cold and calm weather conditions in autumn seem to be important in determining the following winter ice conditions. (Auth.)

51-2678

Classification of polar satellite data using image features and decision tree classifier.

Muramoto, K., Yamanouchi, T., NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.10, Tokyo, National Institute of Polar Research, 1996, p.127-137, 12 refs.

Imaging, Image processing, Sea ice distribution, Spaceborne photography, Mapping, Clouds (meteorology), Mathematical models, Albedo, Data processing

In the polar region, it is difficult to discriminate between clouds and ground surface from satellite visible or infrared data, because of the high albedo and low surface temperature of snow and ice cover. In this paper, a method to classify clouds, sea ice and ground is proposed. This study is based upon analysis of the NOAA/AVHRR infrared images in Antarctica. The algorithm consists of two major approaches: estimating image features and a classification algorithm. A decision tree classifier is designed to classify the region into one of 3 classes using 6 image features. Though sea ice and ground can be largely separated using only one feature, more than 3 features are necessary to separate clouds. (Auth.)

51-2679

Decrease of solute in the aqueous solution in the freezing process.

Sato, K., Daimon, T., Takenaka, N., Bandow, H., Maeda, Y., NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.10, Tokyo, National Institute of Polar Research, 1996, p.138-148, 13 refs.

Freezing points, Ice crystal growth, Ice composition, Ice formation, Experimentation

Dilute volatile acidic aqueous solution was frozen by various freezing methods, and concentrations of solutes and pH of the sample were measured after the sample was completely thawed. Concentration of the volatile acid anion in the sample decreased, and pH of the sample increased after freezing. The decrease of solutes in the sample was almost equal to that detected in the gas phase. When dilute salt solution was frozen, solutes were excluded from ice and concentrated into the unfrozen solution. Concentrated anion combines with concentrated proton to form volatile acid such as acetic, formic or nitrous acid without reaction with any other chemicals. These volatile acids are saturated, and evaporation to the gas phase occurs. It is considered that the decrease in concentration of various solutes is mainly due to the freeze-concentration effect. (Auth.)

51-2680

Effects of polar air on meteorological profiles of mid latitudes. [Influencia do ar polar no perfil meteorológico das regiões de latitude média]

Bui Van, N.A., De Assis Quintão, D., Leite, J.M., *Boletim de geografia teorética,* 1993, 23(45-46), p.131-136, In Portuguese with English summary.

Ozone, Meteorological data, Air temperature, Atmospheric circulation

Data analysis of soundings performed by different meteorological stations in South America and collected by the Meteorological Research Institute (IPMet) of the State University of São Paulo (UNESP-Bauru), allow to determine the vertical meteorological profiles at different latitude. These profiles reveal the existence of a double tropopause which propagates from the Antarctic to the mid-latitude regions, permitting the intrusion of polar air, rich in ozone into these regions. This propagation suggests a transport mechanism of ozone in the high atmosphere. (Auth.)

51-2681

Preliminary study on the ultraviolet radiation in Zhongshan Station, Antarctica.

Bian, L.G., Lu, L.H., Jia, P.Q., *Chinese science bulletin,* Nov. 1996, 41(21), p.1811-1814, 3 refs.

Ozone, Ultraviolet radiation, Meteorological data, Meteorological instruments, Antarctica—Zhongshan Station

The decreasing amount of ozone in the Antarctic causes an increase in ultraviolet radiation reaching the surface; this change has a significant effect on the polar biosphere and on the global ecosystem. Since 1993, radiation and ozone measurements were carried out at Zhongshan Station as part of the program of the Chinese Antarctic Research Expedition. In this note, the character of the ultraviolet and global radiation from Feb. 1993 to Dec. 1994 are analyzed; the relation between the decrease of antarctic ozone in spring and the ultraviolet and global radiation is discussed. (Auth. mod.)

51-2682

Field experiments on physical weathering and wind erosion in an Antarctic cold desert.

Matsuoka, N., Moriwaki, K., Hirakawa, K., *Earth surface processes and landforms,* Aug. 1996, 21(8), p.687-699, Refs. p.698-699.

Wind erosion, Weathering, Deserts, Low temperature research, Frost action, Frozen ground chemistry, Antarctica—Sør Rondane Mountains

Field experiments were carried out over a 5 year period on contemporary weathering and erosional environments in the Sør Rondane Mountains, including observations of scaling from rockwalls, disintegration of tuff blocks, and abrasion of artificial walls by wind. Monitoring was also made of rock surface temperature and wind speed. Rock scaling due to frost action was generally very slow because of low moisture content in the rock-walls. Exposure to the cold, dry climate led to the rapid disintegration of porous tuff blocks including soluble salts like halite and thenardite. This indictes that rates of weathering are increased greatly with the accumulation of salts in the bedrock. Increasing gypsum contents may also intensify rock breakdown. The snow-laden katabatic wind resulted in rapid wearing of the windward face of an asbestos board with the peak erosion at 30-40 cm above the ground. These experiments suggest that frost weathering and wind erosion are only locally effective where plenty of moisture or an abrasive material is available, whilst salt weathering and removal of the waste by wind play a major role in constructing erosional landforms over the mountains. (Auth. mod.)

51-2683

Outburst floods from glacier-dammed lakes: the effect of mode of lake drainage on flood magnitude.

Walder, J.S., Costa, J.E., *Earth surface processes and landforms,* Aug. 1996, 21(8), p.701-723, Refs. p.721-723.

Glacial hydrology, Subglacial drainage, Glacial lakes, Icebound lakes, Ice dams, Lake bursts, Flood forecasting, Statistical analysis, Mathematical models

51-2684

Chemistry of streams of Signy Island, maritime Antarctic: sources of major ions.

Caulkett, A.P., Ellis-Evans, J.C., *Antarctic science,* Mar. 1997, 9(1), p.3-11, 32 refs.

Limnology, Geochemistry, Snow composition, Meltwater, Streams, Antarctica—Signy Island

A general study of the streams of Signy I. was undertaken to identify the effects of catchment, distance from source, and time on concentrations of dissolved ions. In the majority of cases catchment did not affect the chemistry of streams, although marine-derived ions were affected by distance from the sea. Na^+, K^+, Mg^{2+}, Ca^{2+}, Cl^- and NH_4^+ were derived from the thawing of the winter snowpack. NO_3^- was derived from areas of permanent ice. SiO_4^{4-}, Ca^{2+}, Mg^{2+} and CO_3^{2-} were derived from crustal weathering. Although PO_4^{3-} was also derived from crustal weathering, it was released as a pulse related to the thawing of the soil. (Auth.)

51-2685

Methanesulphonate and non-sea salt sulphate in aerosol, snow and ice on the East Antarctic plateau.

De Mora, S.J., Wylie, D.J., Dick, A.L., *Antarctic science,* Mar. 1997, 9(1), p.46-55, Refs. p.54-55.

Snow composition, Ice composition, Aerosols, Impurities, Atmospheric circulation, Antarctica—East Antarctica

This investigation reports the first simultaneous measurement of methanesulphonate (MSA) and non-sea salt sulphate (NSSS) in aerosols, surface snow, and ice core samples for a continental site in Antarctica (78°S, 139°E, elevation 2849 m). Aerosol MSA concentrations ranged from 0.09-0.43 nmol/m^3 STP (median 0.14 nmol/m^3) and were generally lower than those observed at coastal antarctic sites. NSSS concentrations varied from 0.66-1.32 nmol/m^3 STP (median 0.88 nmol/m^3), comparable to those reported for other continental antarctic locations. Whereas the MSA:NSSS molar ratio in aerosol samples was in the range 12.7-32.5% (median 17.0%), the ratio down a snow pit and ice profile varied from 1.14-55.6% (median 3.50%), reflecting the variability to be expected over a period of a decade. The chemical composition and low MSA content suggests an origin of aerosols consistent with long range transport from mid-latitudes. (Auth.)

51-2686

Ice front fluctuation, iceberg calving flux and mass balance of Victoria Land glaciers.

Frezzotti, M., *Antarctic science,* Mar. 1997, 9(1), p.61-73, Refs. p.72-73.

Glacier mass balance, Glacier oscillation, Calving, Ice water interface, Imaging, LANDSAT, Antarctica—Victoria Land

The coast of Victoria Land extends from Williamson Head to McMurdo Sound. A comparison of various documents and images spanning several decades has allowed the determination of the ice front fluctuation and the iceberg calving flux during this century. From 1956-65 to 1972-73, the floating glaciers underwent a reduction of 978 km^2, with an iceberg calving flux of about 134 km^2/yr. From 1972-73 to 1989-91, the floating glaciers underwent an advance of 272 km^2, with an iceberg calving flux of about 53 km^2/yr. Glacier tongues with bottom accretion calve less often than those with bottom melting. Most floating glaciers have shown cyclic behavior without a strong trend. Exceptions are the Hells Gate ice shelf, the McMurdo Ice Shelf, and the floating glaciers of Cape Adare which have undergone a significant retreat since the beginning of the 20th century. The different behavior of these floating glaciers is attributed to increased energy available for meltwater production of marine ice, which progressively warmed the thin ice shelves and then increased iceberg calving, or to increased melting at the ice-ocean interface related to a major intrusion of Circumpolar Deep Water from the nearby continental slope. (Auth. mod.)

51-2687

Theoretical evaluation of mineral stability in Don Juan Pond, Wright Valley, Victoria Land.

Marion, G.M., MP 3970, *Antarctic science,* Mar. 1997, 9(1), p.92-99, 29 refs.

Salt lakes, Thermodynamic properties, Minerals, Stability, Geochemistry, Ice formation, Ice models, Antarctica—Don Juan Pond

Don Juan Pond is the most saline of the antarctic lakes, being a near-saturated $CaCl_2$ solution. As a consequence of this high salinity, Don Juan Pond generally remains unfrozen in winter, even at temperatures below -50°C. Don Juan Pond is the site where antarcticite ($CaCl_2 \cdot 6H_2O$) was first identified forming naturally. The objective of this paper is to demonstrate the utility of a chemical thermodynamic model (FREZCHEM) by developing theoretical stability diagrams for ice, halite (NaCl), hydrohalite ($NaCl \cdot 2H_2O$), and antarcticite in Don Juan Pond, using experimental data collected on 34 days between 1961 and 1983. The model is compatible with the experimental data, and predicts the formation of ice during rare high water periods, halite, and antarcticite. These solid phases have all been reported from Don Juan Pond. The model also predicts the formation of hydrohalite at subzero temperatures; hydrohalite has never been observed at Don Juan Pond, but this may simply reflect that most sampling was done during the summer when halite is thermodynamically more stable than hydrohalite. The FREZCHEM model may prove useful in elucidating the physicochemical behavior, the origin of salinity, and the evolution of antarctic lakes. (Auth. mod.)

51-2688

Assessment of UK Meteorological Office numerical weather prediction analyses and forecasts for the Antarctic.

Leonard, S., Turner, J., Milton, S., *Antarctic science,* Mar. 1997, 9(1), p.100-109, 24 refs.

Meteorological data, Weather forecasting, Mathematical models, Atmospheric circulation, Wind factors, Air temperature, Clouds (meteorology), Snow accumulation

The performance of the UK Meteorological Office operational numerical weather prediction system in the Antarctic is examined. The analysis/forecast model currently has a reasonable representation of the atmospheric circulation, although there are some problems. During the first three days of the forecasts the katabatic winds in the coastal region become too strong compared to those in the initial fields; however, the pattern of katabatic winds across the continent is broadly correct. The forecast tropospheric temperatures are generally too cold, although positive errors are found inland of the coast in the region of descent associated with the katabatic wind circulation. The mean forecast low pressure centers within the circumpolar trough are in approximately the correct locations. During Jan. there is good agreement between the model total cloud amount over the Antarctic and the estimates of total cloud cover from *in situ* observations. However, in July the model has too much cloud. There is no significant change in the amount of cloud during the first three days of the forecasts. The model has a good representation of the broadscale field of snow accumulation across the Antarctic. A comparison of various 6 hour forecast model fields against observations confirms the errors noted in the three-day forecasts when compared against analyses. (Auth. mod.)

51-2689

Exobiological aspects of mass transfer in microzones of permafrost deposits.

Ostroumov, V.E., Siegert, C., *Advances in space research,* Dec. 1996, 18(12), p.(12)79-(12)86, Life Sciences: Space and Mars Recent Results. Proceedings of the F3.1, F3.4, F2.4, and F3.8 Symposia of COSPAR Scientific Commission F which were held during the Thirtieth COSPAR Scientific Assembly, Hamburg, Germany, 11-12 July 1994. Edited by A. Brack, G. Horneck, E.I. Friedmann, M.A. Meyer, G. Reitz, and A. Banin. 24 refs.

Permafrost, Cryobiology, Microbiology, Mass transfer

51-2690

Molecular and biophysical aspects of adaptation of life to temperatures below the freezing point.

Finegold, L., *Advances in space research,* Dec. 1996, 18(12), p.(12)87-(12)95, Life Sciences: Space and Mars Recent Results. Proceedings of the F3.1, F3.4, F2.4, and F3.8 Symposia of COSPAR Scientific Commission F which were held during the Thirtieth COSPAR Scientific Assembly, Hamburg, Germany, 11-12 July 1994. Edited by A. Brack, G. Horneck, E.I. Friedmann, M.A. Meyer, G. Reitz, and A. Banin. 54 refs.

Cryobiology, Microbiology, Permafrost, Lichens, Antarctica—McMurdo Dry Valleys

This review examines adaptation of life to temperatures below -2°C, from a biophysical point of view and relative to the properties of water. Different metabolic processes have different lowest temperatures. The lowest established temperature for photosynthesis and growth seems to be about -17°C. The review discusses membrane lipids from antarctic microbial systems, and the limits to longevity of life in the cold, with coverage of permafrost microbial systems. It is directed towards readers of many backgrounds and supplements an earlier survey. (Auth. mod.)

51-2691

Role of cell differentiation in high tolerance by prokaryotes of long-term preservation in permafrost.

Soĩna, V.S., Vorob'eva, E.A., *Advances in space research,* Dec. 1996, 18(12), p.(12)97-(12)101, Life Sciences: Space and Mars Recent Results. Proceedings of the F3.1, F3.4, F2.4, and F3.8 Symposia of COSPAR Scientific Commission F which were held during the Thirtieth COSPAR Scientific Assembly, Hamburg, Germany, 11-12 July 1994. Edited by A. Brack, G. Horneck, E.I. Friedmann, M.A. Meyer, G. Reitz, and A. Banin. 4 refs.

Microbiology, Permafrost, Bacteria, Russia—Kolyma River

51-2692

Microorganisms and enzyme activity in permafrost after removal of long-term cold stress.

Vorob'eva, E.A., Soĩna, V.S., Mulukin, A.L., *Advances in space research,* Dec. 1996, 18(12), p.(12)103-(12)108, Life Sciences: Space and Mars Recent Results. Proceedings of the F3.1, F3.4, F2.4, and F3.8 Symposia of COSPAR Scientific Commission F which were held during the Thirtieth COSPAR Scientific Assembly, Hamburg, Germany, 11-12 July 1994. Edited by A. Brack, G. Horneck, E.I. Friedmann, M.A. Meyer, G. Reitz, and A. Banin. 7 refs.

Permafrost, Cryobiology, Microbiology, Bacteria, Russia—Kolyma-Indigirka Lowland

51-2693

Cold resistance and metabolic activity of lichens below 0°C.

Kappen, L., Schroeter, B., Scheidegger, C., Sommerkorn, M., Hestmark, G., *Advances in space research,* Dec. 1996, 18(12), p.(12)119-(12)128, Life Sciences: Space and Mars Recent Results. Proceedings of the F3.1, F3.4, F2.4, and F3.8 Symposia of COSPAR Scientific Commission F which were held during the Thirtieth COSPAR Scientific Assembly, Hamburg, Germany, 11-12 July 1994. Edited by A. Brack, G. Horneck, E.I. Friedmann, M.A. Meyer, G. Reitz, and A. Banin. 32 refs.

Microbiology, Cryobiology, Photosynthesis, Antarctica—Wilkes Land, Antarctica—Windmill Islands

Laboratory measurements show that lichens are extremely tolerant of freezing stress and of low-temperature exposure. Metabolic activity recovered quickly after severe and extended cold treatment. Experimental results demonstrate also that CO_2 exchange is already active at around -20°C. The psychrophilic character of polar lichen species is demonstrated by optimum temperatures for net photosynthesis between 0 and 15°C. *In situ* measurements show that lichens begin photosynthesizing below 0°C if the dry thalli receive fresh snow. The lowest temperature measured in active lichens was -17°C at a continental antarctic site. The fine structure and the hydration state of photobiont and mycobiont cells were studied by low-temperature scanning electron microscopy (LTSEM) of frozen hydrated specimens. Water potentials of the frozen system are in the range of or even higher than those allowing dry lichens to start photosynthesis by water vapor uptake at +10°C. The great success of lichens in polar and high alpine regions gives evidence of their physiological adaptation to low temperatures. In general lichens are able to persist through glacial periods, but extended snow cover and glaciation are limiting factors. (Auth.)

51-2694

H_2SO_4 component of stratospheric aerosols derived from satellite infrared extinction measurements: application to stratospheric transport studies.

Lambert, A., Grainger, R.G., Rogers, H.L., Norton, W.A., Rodgers, C.D., Taylor, F.W., *Geophysical research letters,* Aug. 15, 1996, 23(17), p.2219-2222, 26 refs.

Stratosphere, Aerosols, Atmospheric composition, Chemical composition, Measurement

51-2695

Implications of the large carbon kinetic isotope effect in the reaction CH_4 + Cl for the $^{13}C/^{12}C$ ratio of stratospheric CH_4.

Bergamaschi, P., et al, *Geophysical research letters,* Aug. 15, 1996, 23(17), p.2227-2230, 30 refs.

Stratosphere, Aerosols, Atmospheric composition, Chemical composition, Measurement

In order to assess the effect of the exceptionally large KIE_{Cl} on $\delta^{13}C$ of stratospheric CH_4 the authors applied a two-dimensional, time dependent chemical transport model. The model results demonstrate the strong influence of the CH_4+Cl reaction on $\delta^{13}CH_4$ in particular in the middle and upper stratosphere, where this reaction contributes several tens of percent to the total CH_4 sink. The Cl sink helps to explain the relatively large overall isotope fractionation of 1.010-1.012 observed in the lower stratosphere, even though the model results predict a smaller effect than observed. Measurements extending from about 65°-85°S to 85°N are depicted in accompanying figures and discussed in the text. (Auth. mod.)

51-2696

Changes in orientation of near-surface stress field as constraints to mantle viscosity and horizontal stress differences in Eastern Canada.

Wu, P., *Geophysical research letters,* Aug. 15, 1996, 23(17), p.2263-2266, 21 refs.

Stresses, Viscosity, Tectonics, Models, Geophysical surveys, Canada

51-2697

Latitudinal distribution of upper level ClO as derived from space borne microwave spectroscopy.

Aellig, C.P., et al, *Geophysical research letters,* Aug. 15, 1996, 23(17), p.2321-2324, 16 refs.

Stratosphere, Aerosols, Atmospheric composition, Chemical composition, Measuring instruments

Latitudinal distributions of upper stratospheric ClO measured by MAS during the three ATLAS missions are presented for Northern Hemisphere (NH) spring equinox in 1992, Southern Hemisphere (SH) early fall in 1993, and NH fall in 1994. The MAS ClO results are shown along with correlative MLS observations. The results of both instruments consistently show the same latitudinal features. The ClO maximum in the NH spring occurs at mid-latitudes, whereas the latitudinal ClO maximum in both the NH and SH fall occurs at high latitudes. The volume mixing ratio maxima were significantly higher in the fall (0.7-0.8 ppbv) than in spring (0.5-0.6 ppbv). Qualitatively, these results are consistent with calculations of several 2-D models. (Auth.)

51-2698

Interpretation of ice sheet stratigraphy: a radio-echo sounding study of the Dyer Plateau, Antarctica.

Weertman, B.R., Seattle, University of Washington, 1993, 197p., University Microfilms order No. 94-17099, Ph.D. thesis. Refs. p.131-137.

Ice sheets, Ice cores, Stratification, Ice accretion, Glacier flow, Climatic factors, Antarctica—Dyer Plateau

The author has used a newly devised RES system to measure the geometry of internal stratigraphy and ice thickness on the Dyer Plateau ice sheet. RES-determined stratigraphy was dated by comparison to ice core stratigraphy. A prominent shallow RES horizon probably associated with the eruption of Tambora (1815) was used for estimating the spatial accumulation rate pattern. The estimated pattern is consistent with the pattern measured from burial markers indicating that the new method is accurate and that the recent accumulation rate pattern is not different from the 175 year average. An analysis of ice core stratigraphy indicates that over the past 500 years the accumulation rate has varied and over the past 50 years has had an increasing trend. However, dated RES stratigraphy (top half of ice column) appears to be consistent with steady-state flow suggesting that climate variations over the past 500 years have not been sufficient to alter ice flow. (Auth. mod.)

51-2699

ECC ozonosonde observations at South Pole, Antarctica, during 1989.

Komhyr, W.D., Crozer, E.A., Lathrop, J.A., Winey, M.A., *U.S. National Oceanic and Atmospheric Administration. Climate Monitoring and Diagnostic Laboratory. Data report,* June 1990, NOAA-DR-ERL-CMDL-5, 247p., PB90-258914, Refs. p.5-7.

Ozone, Atmospheric composition, Atmospheric circulation, Air temperature, Wind (meteorology), Meteorological instruments, Design, Performance, Antarctica—Amundsen-Scott Station

Atmospheric ozone vertical distributions, air temperatures, and wind speed and wind direction data are presented for 60 balloon electrochemical concentration cell (ECC) ozonosonde soundings made at the Amundsen-Scott Station in 1989. (Auth)

51-2700

Dynamical model for wind-driven ice motion: Application to ice drift on the Labrador Shelf.

Tang, C.L., Gui, Q., *Journal of geophysical research,* Dec. 15, 1996, 101(C12), p.28,343-28,364, 42 refs.

Models, Sea ice, Ocean currents, Wind (meteorology), Labrador Sea

51-2701

Residence times in the upper Arctic Ocean.

Becker, P., Björk, G., *Journal of geophysical research,* Dec. 15, 1996, 101(C12), p.28,377-28,396, 46 refs.

Ocean environments, Mathematical models, Water temperature, Salinity, Sea ice, Arctic Ocean

51-2702

Surface and radiative characteristics of the summer Arctic sea ice cover from multisensor satellite observations.

Comiso, J.C., Kwok, R., *Journal of geophysical research,* Dec. 15, 1996, 101(C12), p.28,397-28,416, 34 refs.

Thermodynamic properties, Sea ice, Water temperature, Brightness, Measuring instruments, Arctic Ocean

51-2703

Seasonal characteristics of the perennial ice cover of the Beaufort Sea.

Kwok, R., Comiso, J.C., Cunningham, G.F., *Journal of geophysical research,* Dec. 15, 1996, 101(C12), p.28,417-28,439, 27 refs.

Sea ice distribution, Seasonal variations, Remote sensing, Measuring instruments, Arctic Ocean, Beaufort Sea

51-2704

Thickness distribution of sea ice and snow cover during late winter in the Bellingshausen and Amundsen Seas, Antarctica.

Worby, A.P., Jeffries, M.O., Weeks, W.F., Morris, K., Jaña, R., *Journal of geophysical research,* Dec. 15, 1996, 101(C12), p.28,441-28,455, 35 refs.

Sea ice distribution, Ice cover thickness, Ice deformation, Snow cover distribution, Antarctica—Bellingshausen Sea, Antarctica—Amundsen Sea

The data are a combination of *in situ* and ship-based measurements and show that the process of floe thickening is highly dependent on ice deformation; in particular, rafting and ridging play important roles at different stages of floe development. Rafting is the major mechanism in the early stages of development, and core structure data show the mean thickness of individual layers of crystals to be only 0.12 m. Most ice <0.3 m is not ridged but is usually rafted before attaining this thickness, well before thermodynamic growth has ceased. In thicker floes, ridging is more common, with most floes >0.6 m having some surface deformation. Blocks within ridge sails are typically in the range 0.3-0.6 m thick, and ship-based observations estimate approximately 25% of the pack exhibits surface ridging. When corrected for biases in the observational methods, the data show that the dominant ice and snow thickness categories are >0.7 m and 0.2-0.5 m, respectively, and account for 40% and 36% of the surface area of the pack ice. Approximately 8% of the pack is open water. An estimate of the effects of ridging on the distribution of ice mass within the pack suggests that between 50 and 75% of the total mass is contained within the 25% of the pack that exhibits surface ridging. (Auth. mod.)

51-2705

Ozone monitoring with TIROS-N operational vertical sounders.

Neuendorffer, A.C., *Journal of geophysical research,* Aug. 20, 1996, 101(D13), p.18,807-18,828, 41 refs.

Ozone, Stratosphere, Models, Measuring instruments, Atmospheric composition, Chemical composition

The potential for using the TIROS-N operational vertical sounder (TOVS) on NOAA polar-orbiting weather satellites to monitor stratospheric ozone is examined. TOVS 9.7-μm high resolution infrared sounder (HIRS) ozone channel is particularly well suited for monitoring the lower stratospheric ozone layer. A 3 Dobson unit drop in lower stratospheric ozone produces a measurable (i.e., ≈0.2°C) increase in HIRS 9.7-μm brightness temperatures even in the vicinity of Antarctica. A two-layer physical retrieval algorithm is presented that uses the TOVS HIRS 9.7-μm signal to determine lower stratospheric ozone and to estimate total ozone. Trend analysis of TOVS ozone confirms the fact that there have been significant losses of lower stratospheric ozone in the spring equinox extratropics of both hemispheres. Much of this loss persists into the summer solstice time period. Data is shown for both northern and southern polar regions. (Auth. mod.)

51-2706
Chlorine deactivation in the lower stratospheric polar regions during late winter: results from UARS.
Santee, M.L., et al, *Journal of geophysical research,* Aug. 20, 1996, 101(D13), p.18,835-18,859, 95 refs.
Atmospheric composition, Chemical composition, Clouds (meteorology), Measuring instruments
Time series of vortex-averaged mixing ratios are calculated on two potential temperature surfaces (585 K and 465 K) in the lower stratosphere for approximately month-long intervals during late winter: Aug. 17-Sep. 17, 1992, in the Southern Hemisphere and Feb. 12-Mar. 16, 1993, in the Northern Hemisphere. The observed mixing ratios are adjusted for the effects of vertical transport using diabatic vertical velocities estimated from CLAES tracer data. In the Northern Hemisphere, the decrease in ClO_x is balanced on both surfaces by an increase in $ClONO_2$. in the Southern Hemisphere, continuing polar stratospheric cloud activity prevents ClO from undergoing sustained decline until about Sep. 3. In contrast to the Northern Hemisphere, there is no significant chemical change in vortex-averaged $ClONO_2$ at 465 K, and there is an apparent decrease in $ClONO_2$ at 585 K, even after the enhanced ClO abundances have started to recede. Results from the SLIMCAT chemical transport model initialized with UARS data and run with $OH+ClO \rightarrow HCl+O_2$ as an 8% channel suggest that the primary recovery product in the south during this time period is not $ClONO_2$, but HCl. HALOE HCl mixing ratios are extrapolated back to the time of the MLS and CLAES data. (Auth. mod.)

51-2707
Modeling ice passage at locks and dams.
Tatinclaux, J.C., Rand, J.H., Gooch, G.E., MP 3971, *U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin,* July 1992, No.1, 4p., 2 refs.
River ice, Ice control, Ice passing, Locks (waterways), Dams, Sluices (hydraulic engineering), Hydraulic structures, Environmental tests

51-2708
Ice jam statistics recorded on data base.
White, K.D., MP 3972, *U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin,* Nov. 1992, No.2, 4p.
River ice, Ice jams, Data processing

51-2709
Ice vibrations on the arctic channel.
Kutschale, H.W., *Columbia University. Lamont-Doherty Earth Observatory. Report,* Mar. 1996, No.5-21644, 11p. + figs., ADA-317 278, 6 refs.
Supported by the U.S. Office of Naval Research under Contract N00014-87-K-0274, Jan. 1, 1987-Dec. 31, 1988.
Underwater acoustics, Ice acoustics, Ice water interface, Subglacial observations, Acoustic measurement, Sound waves, Sound transmission, Seismic velocity, Computerized simulation

51-2710
Ice motion detector system.
Zufelt, J.E., MP 3973, *U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin,* Sep. 1993, No.4, 4p.
River ice, Ice breakup, Ice jams, Ice detection, Ice forecasting, Flood forecasting, Electrical logging, Monitors, Warning systems

51-2711
Freezeup ice jam control.
White, K.D., MP 3974, *U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin,* Jan. 1994, No.5, 4p., 8 refs.
River ice, Freezeup, Frazil ice, Ice jams, Ice control, Ice booms

51-2712
Field measurement of ice forces and bed erosion during breakup.
Zabilansky, L.J., MP 3975, *U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin,* Apr. 1994, No.6, 4p.
Bridges, Piers, Accidents, River ice, Ice breakup, Ice loads, Ice erosion, Ice scoring, Monitors, Radio beacons, United States—Vermont—White River Junction

51-2713
Weakening ice by dusting with leaves.
Haynes, F.D., Haehnel, R.B., Clark, C.H., MP 3976, *U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin,* July 1994, No.7, 4p.
River ice, Ice control, Ice deterioration, Ice melting, Artificial melting, Dusting, Albedo

51-2714
Low-cost breakup ice control structure.
Lever, J.H., MP 3977, *U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin,* Mar. 1995, No.8, 4p.
River ice, Ice breakup, Ice jams, Ice control, Flood control, Hydraulic structures, Rock fills, Floodplains, Cost analysis

51-2715
Characterizing ice jams in New Hampshire and Vermont using the CRREL Ice Jam Database.
White, K.D., MP 3978, *U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin,* June 1995, No.9, 4p., 4 refs.
River ice, Freezeup, Ice breakup, Ice jams, Accidents, Floods, Flood forecasting, Data processing, Statistical analysis, United States—New Hampshire, United States—Vermont

51-2716
Introducing the Ice Jam Archive.
Herrin, L., Balch, E., MP 3979, *U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin,* Sep. 1995, No.10, 4p., 4 refs.
River ice, Ice jams, Data processing, Statistical analysis

51-2717
Breaking river ice to prevent ice jams.
Haehnel, R.B., Haynes, F.D., Clark, C.H., MP 3980, *U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin,* Oct. 1995, No.11, 4p.
River ice, Ice jams, Ice breaking, Amphibious vehicles, Cost analysis

51-2718
Bridge pier design for ice forces.
Haynes, F.D., MP 3981, *U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin,* Dec. 1995, No.12, 4p., 6 refs.
Bridges, Piers, River ice, Ice solid interface, Ice loads, Ice pressure, Ice friction, Design criteria

51-2719
Safe loads on ice sheets.
Haynes, F.D., Carey, K.L., MP 3982, *U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin,* Jan. 1996, No.13, 4p., 3 refs.
River ice, Lake ice, Ice cover strength, Ice loads, Ice cover thickness, Ice cracks, Ice breaking, Ice roads, Ice crossings, Safety

51-2720
Drilling holes in ice to reduce ice jam potential.
Haehnel, R.B., MP 3983, *U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin,* Feb. 1996, No.14, 4p., 1 ref.
River ice, Ice jams, Ice drills, Ice cutting, Ice breaking, Ice control, Augers, Cost analysis, United States—Wisconsin—Oconto

51-2721
Winter morning air temperature.
Hogan, A.W., Ferrick, M.G., MP 3984, *Journal of applied meteorology,* Jan. 1997, 36(1), p.52-69, 43 refs.
Snow cover effect, Snow air interface, Air temperature, Surface temperature, Temperature inversions, Temperature gradients, Diurnal variations, Weather forecasting, Statistical analysis, United States—Connecticut River
Results of temperature measurements, which may be applied to inference of winter temperatures in data-sparse areas, are presented. The morning air temperatures during three winters were measured at 80 places in a 10 km x 30 km area along the Connecticut River. NOAA climatologies show this region to have complex spatial variation in mean minimum temperature. Frequency analysis techniques were applied to evaluate the differences in daily local temperature. Temperature lapse or temperature inversion in the study area was inferred from the difference of surface temperature measurements 100 and 300 m above river level. The frequency of inferred temperature lapse and the inferred lapse rate diminished as snow cover increased. The frequency of inferred temperature inversion and inversion strength increased as snow cover increased. When more than 20 cm of snow covered the ground, an additional surface inversion was frequent in the layer less than 100 m above river level, and two-thirds of river level temperatures less than -20°C occurred concurrent with these conditions. The daily temperature differences at the individual points, with respect to a defined point, were lognormally distributed. The magnitude and geometric standard deviation of temperature differences throughout the study area were larger on mornings when inversion was inferred. With respect to topography, temperature differences and the geometric standard deviation of temperature differences were smaller along flats or among basins than along or atop slopes on mornings when inversion was inferred. It is proposed that some meteorologically prudent inferences of surface temperature and near-surface temperature lapse or temperature inversion can be made for similar data-sparse areas.

51-2722
Laboratory and analytical methods for explosives residues in soil.
Walsh, M.E., Jenkins, T.F., Thorne, P.G., MP 3985, *Journal of energetic materials,* 1995, Vol.13, p.357-383, 90 refs.
Soil pollution, Soil tests, Soil chemistry, Chemical analysis, Explosives, Military facilities, Waste disposal, Land reclamation
Standard analytical methods have been developed to characterize explosives residues in soil at U.S. Department of Defense installations. The laboratory analysis is conducted using RP-HPLC, and the most commonly found analytes are TNT and RDX. Other analytes commonly detected are the environmental transformation products of TNT including TNB, dinitroaniline, and the isomers of amino-DNT, and the manufacturing by-products DNB and the isomers of amino-DNT. Field methods designed to detect TNT and RDX have enhanced site characterization by providing rapid on-site results for a greater number of samples than would be economically feasible by depending solely on off-site laboratory analyses for all samples. Attempts may be made to use both laboratory and field methods to analyze treatment matrices such as incinerator ash and compost, but further analytical method development is needed to enhance extraction and minimize interferences.

51-2723
Review on ageing of fiber reinforced polymer composites.
Ganga Rao, H.V.S., Dutta, P.K., MP 3986, Middle East Workshop on Structural Composites, 1st, Sharm El-sheikh, Egypt, June 14-15, 1996. Advanced composite materials state-of-the-art report, Cairo, Egypt, Egyptian Society of Engineers, 1996, p.45-58.
Composite materials, Polymers, Construction materials, Structural analysis, Weathering, Fatigue (materials)
Advanced composite materials are expected to perform satisfactorily over a period of at least fifty years. To gain some level of confidence of using these materials in large quantities, accelerated ageing procedures are needed to predict the long term material performance limits. The long term material performance in terms of mechanical properties depend on environmental conditions, chemical exposures, and load applications. It has been found that materials can be treated in an accelerated manner in hot-wet conditions and under certain pressures to predict mechanical property for very long times ahead. The salient issues governing the strength, stiffness, and durability of continuous fiber reinforced polymer composites under mechanical and environmental loads are briefly reviewed. For example, degradation rates of strength and stiffness under typical environmental conditions and service conditions are given for hybrid structural members, i.e., conventional materials reinforced with composite shells. In addition, attention is drawn to the effects of pH levels, applied stress, chemical reactions and hygrothermal fluctuations in understanding ageing of polymer composites. The ageing of fiber reinforced polymer composites is briefly discussed and an accelerated ageing procedure for predicting the long-term behavior is described.

51-2724
Snow cover effects on impulsive noise propagation in a forest.
Albert, D.G., MP 3987, International Congress on Noise Control Engineering, 25th, Liverpool, England, 1996. Inter-noise 96, Poughkeepsie, NY, Noise Control Foundation, 1996, p.663-668, 20 refs.
Snow acoustics, Snow depth, Snow air interface, Snow cover effect, Forest land, Noise (sound), Sound transmission, Sound waves, Wave propagation

The amplitude and waveform shape of atmospheric acoustic pulses propagating horizontally over a seasonal snow cover are profoundly changed by the air forced into the snow pores as the pulses move over the surface. This interaction greatly reduces the pulse amplitude and elongates the waveform compared to propagation above other ground surfaces. A comparison of experimentally observed blank pistol shot waveforms with waveforms theoretically calculated using a rigid porous media model for the snow and ground can be used to determine the snow cover properties. By varying the source and receiver positions during the experimental measurements, the spatial variations in snow properties near the edge of a forest were sampled at the site of the 1995 Norwegian winter blast tests. An inversion procedure that automatically matches the observed waveforms revealed a very shallow area of snow, just inside the forest, caused by the warming effect of the trees which absorb and reradiate solar energy. These acoustic measurements were in agreement with direct depth measurements and snow pit observations. The waveform inversion procedure is able to accurately determine the snow cover conditions even in the highly variable region at the edge of the forest.

51-2725

On wavelet analysis of nonstationary turbulence.

Treviño, G., Andreas, E.L., MP 3988, *Boundary-layer meteorology,* 1996, Vol.81, p.271-288, 24 refs.

Atmospheric boundary layer, Turbulent boundary layer, Turbulence, Wave propagation, Data processing, Image processing, Statistical analysis, Mathematical models

Wavelets are new tools for turbulence analysis that are yielding important insights into boundary-layer processes. Wavelet analysis, however, has some as yet undiscussed limitations: failure to recognize these can lead to misinterpretation of wavelet analysis results. Here the authors discuss some limitations of wavelet analysis when applied to nonstationary turbulence. The main point is that the analysis wavelet must be carefully matched to the phenomenon of interest, because wavelet coefficients obscure significant information in the signal being analyzed. For example, a wavelet that is a second-difference operator can provide no information on the linear trend in a turbulence signal. Wavelet analysis also yields no meaningful information about nonlinear behavior in a signal—contrary to claims in the literature—because, at any instant, a wavelet is a single-scale operator, while nonlinearity involves instantaneous interactions among many scales.

51-2726

Assessing the significance of subgrade variability on test section performance.

Kestler, M.A., MP 3989, Uncertainty in the geologic environment: from theory to practice. Geotechnical special publication, No.58. Uncertainty '96, July 31-Aug. 3, 1996. Proceedings. Vol.1, New York, American Society of Civil Engineers, 1996, p.685-694, 15 refs.

DLC TA703.5.U53 1996

Subgrade soils, Ground thawing, Thaw depth, Thaw weakening, Soil strength, Soil trafficability, Subgrade maintenance, Road maintenance, Soil stabilization, Soil tests, Environmental tests, Statistical analysis

Variations in subgrade moisture and strength are suspected to be reflected in variations in test section performance. Using relatively simple statistics and geostatistics, this paper mathematically shows that this was indeed the case at one particular field demonstration site. Additionally, a range of influence was quantified for the site. During the 1995 spring thaw season, a variety of expedient surfaces were constructed to demonstrate rapid stabilization techniques for thawing soils as part of a cooperative field project at Fort McCoy, WI. Mechanical stabilizing techniques evaluated include chunkwood, tire chips, gravel, wooden mats, tire mats, geosynthetics, and slash (brush, tree branches and limbs). Materials were used both separately and in combination with each other. Surfacing materials were then subjected to two sets of 50 vehicle passes (wheeled and tracked), and test sections were rated for performance both during and after trafficking. Prior to test section construction, a sampling and testing program was established, and tests were conducted to define preconstruction variability as functions of subgrade strength, moisture, density, and thaw depth. This paper focuses on site variability aspects of the overall field demonstration project, and applies statistical and geostatistical techniques to evaluate the significance of preconstruction site variability on variations in test section performance.

51-2727

Rapid stabilization of thawing soils: a demonstration project.

Kestler, M.A., Shoop, S.A., Henry, K.S., Stark, J.A., MP 3990, *U.S. Forest Service. North Central Forest Experiment Station, St. Paul, MN. General technical report,* 1996, NC-186, Planning and implementing forest operations to achieve sustainable forests, p.166-178, 9 refs. Presented at the joint meeting of the Council on Forest Engineering and International Union of Forest Research Organizations, Marquette, MI, July 29-Aug. 1, 1996.

Ground thawing, Thaw weakening, Soil trafficability, Soil stabilization, Geotextiles, Military engineering, Road maintenance, Environmental tests

The U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) conducted a field demonstration project in which a variety of expedient surfaces were constructed and trafficked to test stabilization techniques for thawing soils. The project was conducted at Fort McCoy, WI, during the 1995 spring thaw. Cooperating partners included the Wisconsin National Guard, the U.S. Army Engineer School, the USDA Forest Service (USFS), Terramat, and Uni-Mat International, Inc. As part of the overall project, the stabilizing techniques were evaluated for expediency, ease of construction, performance during trafficking, and vehicle mobility enhancement. The test and evaluation program generated recommendations for construction of expedient roads under thawing conditions to be incorporated into military engineering decision aids and simulations. The information is also applicable for non-military purposes such as timber- and pipeline-access in the logging, oil and gas industries. This paper provides a general description of the techniques tested and installation methods used as well as some difficulties associated with each. It also briefly describes the tests performed and types of data gathered.

51-2728

Extension and compression of elastomeric butt joint seals.

Ketcham, S.A., Niemiec, J.M., McKenna, G.B., MP 3991, *Journal of engineering mechanics,* July 1996, 122(7), p.669-677, 21 refs.

Rubber, Joints (junctions), Sealing, Elastic properties, Tensile properties, Compressive properties, Strain tests, Low temperature tests, Stress strain diagrams, Structural analysis, Mathematical models

The conventional practice for the design of elastomeric butt joint seals in pavement and building expansion joints is based primarily on standard tests of model seals. The practice does not incorporate structural analysis and does not utilize mechanical properties of the sealant. This study concerns the applicability of a particular load versus deflection equation for the extension and compression design of these seals, i.e., an elementary large compression equation for bonded rubber blocks. The study demonstrates, using experiments to measure strain energy density functions for two sealants, by application of these functions in finite-element analyses and by comparison of the finite-element and elementary analysis results, the capabilities and limitations of the load versus deflection equation. In the process, the study introduces an efficient experimental technique for evaluating coefficients of the Rivlin strain energy density polynomial for general application to the analysis of elastomeric structures, and demonstrates the utility of the finite-element-based approach for extension and compression analysis of butt joint seals.

51-2729

Distributed millimeter-wave radar modeling for the winter battlefield.

Davis, R.E., Henson, J.M., Koenig, G.G., MP 3992, Army Science Conference, 20th, Norfolk, VA, June 24-27, 1996. Science and technology for Force XXI. Proceedings. Vol.2, Washington, D.C., U.S. Department of the Army, Assistant Secretary for Research, Development and Acquisition, 1996, p.857-861, 10 refs.

Snow cover effect, Radar tracking, Radar photography, Radar echoes, Backscattering, Terrain identification, Military operation, Environment simulation, Computerized simulation, Image processing

Winter battlefield conditions present a range of backgrounds to a radar seeker/sensor varying from hostile to friendly, depending on the spectral range of the sensor and the state (e.g., thawed/frozen) of the snow or soil. Millimeter-wave radar sensing of the winter battlefield presents a special challenge because snow exhibits a huge range in backscatter intensity and polarization. Wet snow provides a relatively dark background at non-nadir views, while refrozen snow presents one of the brightest natural land covers. An image processing, GIS-like approach aggregates information layers into patches for model calculations. These consist of similar land cover and terrain attributes. Physics-based models of snow and soil processes couple to models of radar cross section. Time series of solutions map back into data layers and couple to a radar scene generator. Scenes can represent virtually any forward scan or sidelooking radar system of interest, viewing the test area from a fixed point over time. Validation of the modeling system followed an incremental plan. Predicted snow and soil properties, radar cross sections, and generated scenes compare favorably against measurements from extensive field tests. Examples from a 3-day simulation period show much of the dynamic range and spatial heterogeneity observed on winter battlefields.

51-2730

Cold regions tactical shelter.

Flanders, S.N., Tobiasson, W., MP 3993, *Military engineer,* Sep.-Oct. 1978, No.457, p.332-333, 1 ref.

Shelters, Modular construction, Cold weather operation, Cold weather construction, Military equipment

51-2731

Some thoughts on snowloads.

Tobiasson, W., MP 3994, *Roofing Industry Educational Institute, Englewood, CO. Information letter,* Winter 1995, No.50, p.1-3, For another version see 49-3171.

Snow loads, Roofs, Waterproofing, Design criteria

51-2732

Vehicle motion resistance due to snow.

Richmond, P.W., MP 3995, Army Science Conference Proceedings, June 12-15, 1990. Vol.3, Washington, D.C., U.S. Department of the Army, Assistant Secretary for Research, Development and Acquisition, 1990, p.125-136, 5 refs.

Motor vehicles, Tracked vehicles, Vehicle wheels, Snow vehicles, Rubber snow friction, Metal snow friction, Traction, Military equipment, Military engineering, Cold weather tests, Environmental tests

51-2733

Anti-icing field evaluation.

Ketcham, S.A., Minsk, L.D., MP 3996, International Symposium on Snow Removal and Ice Control Technology, 4th, Reno, NV, Aug. 11-16, 1996. Preprints. Vol.1, Washington, D.C., National Research Council, Transportation Research Board, 1996, 10p., 4 refs.

Road icing, Snowstorms, Ice storms, Chemical ice prevention, Salting, Sanding, Snow removal, Rubber snow friction, Rubber ice friction, Cold weather tests, Road maintenance

51-2734

Corps lab employs disabled students.

Darling, M., MP 3997, *Engineer update,* Jan. 1997, 21(1), p.9.

Organizations, Labor factors, Education, Human factors engineering, Health

51-2735

Cesium-137 contamination in arctic sea ice.

Meese, D.A., Cooper, L.W., Larsen, I.L., Tucker, W.B., Reimnitz, E., Grebmeier, J.M., MP 3998, International Symposium on Environmental Radioactivity in the Arctic, Oslo, Norway, Aug. 21-26, 1995. Edited by P. Strand, et al, Østerås, Norway, Norwegian Radiation Protection Authority (Statens Strålevern), 1995, p.195-198.

Radioactive wastes, Fallout, Water pollution, Sea ice, Ice cover effect, Ice composition, Impurities, Drift

51-2736

Performance of ground-coupled heat pumps at Patuxent River NAS—lessons learned and procurement guidance.

Phetteplace, G., Monaghan, S.K., Garg, S., MP 3999, *U.S. Naval Facilities Engineering Service Center, Port Hueneme, CA. Site specific report,* Oct. 1996, SSR-2268-E&U, 63p., 12 refs.

Military facilities, Buildings, Heat pumps, Heat pipes, Heat transfer, Heat recovery, Geothermy, Radiant heating, Cooling systems, United States—Maryland—Patuxent River Naval Air Station

The primary objective of this project was to determine the performance of the ground-coupled heat pump HVAC systems installed as part of the building renovation to Building 2189 at Patuxent Naval Air Station. Of particular interest was the net heat extracted from the ground, the electrical energy input to the heat pumps, and the net thermal effect delivered to the building space in both the heating and cooling mode. Also of concern was the operating performance of the heat pumps and the ground coupling loops. The finding of this study will be used in determining the suitability of such systems for use on other Navy facilities.

51-2737

Instructions for monitoring instrumentation in the Thule hangars.

Tobiasson, W., Flax, D., MP 4000, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, Apr. 1972, 75p.

Military facilities, Airports, Buildings, Floors, Frozen ground temperature, Soil temperature, Thaw depth, Thaw weakening, Settlement (structural), Temperature measurement, Thermocouples, Monitors, Greenland

51-2738

Survey of icing problems at Corps projects.

DenHartog, S.L., Haynes, F.D., MP 4001, *U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin,* June 1993, No.3, p.1-2, 1 ref.

River ice, Ice loads, Ice control, Hydraulic structures

51-2739

Horizontal thermosyphons.

DenHartog, S.L., Haynes, F.D., MP 4002, *U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin,* June 1993, No.3, p.2-4.

Hot oil lines, Suspended pipelines, Permafrost beneath structures, Permafrost preservation, Heat pipes, Heat transfer

51-2740

Analysis of ice- and snow traction of tread material.

Futamura, S., *Rubber chemistry and technology,* Sep.-Oct. 1996, 69(4), p.648-653, 14 refs.

Tires, Rubber, Rubber snow friction, Rubber ice friction, Skid resistance, Traction, Cold weather tests

51-2741

Funding of arctic research, planning and projects.

International Arctic Science Committee (IASC), IASC report, No.6, Oslo, 1996, 38p.

Research projects, Organizations, Regional planning, International cooperation, Cost analysis

51-2742

Frozen ground. *International Permafrost Association. News bulletin,* Dec. 1996, No.20, 15p.

Research projects, Organizations, Meetings, Permafrost

51-2743

Rapid freezing effects on nitrification and denitrification enzyme activity in saturated soil and aquatic sediments.

Cooke, J.G., *Soil biology & biochemistry,* 1990, 22(8), p.1171-1172, 10 refs.

Artificial freezing, Frozen ground chemistry, Soil chemistry, Soil microbiology, Cryobiology, Nutrient cycle

51-2744

Standard test method for resistance of concrete to rapid freezing and thawing.

American Society for Testing and Materials, Annual book of ASTM standards. ASTM designation C 666-92, Philadelphia, PA, 1992, 6p., Refs. passim.

Concrete freezing, Concrete strength, Frost resistance, Freeze thaw tests, Standards

51-2745

Standard test methods for frost heave and thaw weakening susceptibility of soils.

American Society for Testing and Materials, Annual book of ASTM standards. ASTM designation D 5918-96, Philadelphia, PA, 1996, 12p., Refs. passim.

Pavements, Subgrade soils, Soil freezing, Soil strength, Frozen ground strength, Frost resistance, Frost heave, Thaw weakening, Soil tests, Freeze thaw tests, Standards

51-2746

Influence of ambient temperature on warm engine exhaust emissions from passenger cars.

Lenner, M., *Swedish National Road and Transport Research Institute (Statens väg- och transportforskningsinstitut). VTI meddelande,* 1996, No.790A, 29p., 12 refs.

Motor vehicles, Engine starters, Fuels, Pollution, Cold weather tests, Sweden

51-2747

Effect of salt additives on concrete degradation (Phase II). Executive summary.

Jang, J.W., Iwasaki, I., Weiblen, P., *Minnesota Department of Transportation, St. Paul. Report,* Feb. 1995, MN/RC-96/10, 17p., 14 refs.

Road icing, Salting, Chemical ice prevention, Environmental impact, Concrete durability, Corrosion

51-2748

Use of crushed concrete products in Minnesota pavement foundations. Final report.

Snyder, M.B., *Minnesota Department of Transportation, St. Paul. Report,* Mar. 1995, MN/RC-96/12, 35p. + append., 9 refs.

Concrete pavements, Concrete aggregates, Pavement bases, Drains, Water pollution, Soil pollution, Road maintenance, United States—Minnesota

51-2749

Annual report 1996.

National Snow and Ice Data Center. World Data Center-A for Glaciology, Boulder, University of Colorado, 26p., Refs. passim. This report presents highlights for FY 1996. A complete report is to be published in June 1997.

Snow surveys, Ice surveys, Glacier surveys, Organizations, Research projects, Data processing

51-2750

Lidar observations of polar stratospheric clouds and stratospheric temperature in winter 1995/96 over northern Norway.

Hansen, G., Hoppe, U.P., *Geophysical research letters,* Jan. 15, 1997, 24(2), p.131-134, 15 refs.

Polar atmospheres, Atmospheric composition, Stratosphere, Air temperature, Polar stratospheric clouds, Cloud physics, Ozone, Lidar, Norway

51-2751

New oceanographic data from beneath Ronne Ice Shelf, Antarctica.

Nicholls, K.W., Makinson, K., Johnson, M.R., *Geophysical research letters,* Jan. 15, 1997, 24(2), p.167-170, 20 refs.

Oceanographic surveys, Ocean currents, Temperature measurement, Ice water interface, Ice shelves, Ice melting, Antarctica—Ronne Ice Shelf

Oceanographic data have been obtained via an access hole made through Ronne Ice Shelf. The site, which is the third in a series of similar studies, lies 17 km west of Korff Ice Rise where 825 m of ice overlies a 485-m deep water column. Measurements included conductivity and temperature profiles, and an instrument mooring was deployed for long-term measurements of currents, temperature and conductivity. At the sea floor there was a 150-m layer of well-mixed water with a potential temperature and salinity of -1.97°C and 34.72. The water cooled and freshened towards the ice-shelf base, ultimately reaching -2.41°C and 34.51. The hydrographic and water current data imply a flow into the deepest part of the sub-ice shelf cavity of about 200,000 m^3/s of the deeper, relatively warm water, which would be able to power an average basal melt rate of 0.2 m/a for the western portion of Ronne Ice Shelf. (Auth.)

51-2752

Undersaturation of CH_3Br in the Southern Ocean.

Lobert, J.M., Yvon-Lewis, S.A., Butler, J.H., Montzka, S.A., Myers, R.C., *Geophysical research letters,* Jan. 15, 1997, 24(2), p.171-172, 7 refs.

Atmospheric composition, Sea water, Chemical composition, Air water interactions, —South Pacific Ocean

Dry mole fractions of methyl bromide (CH_3Br) in marine boundary layer air and in air equilibrated with surface water were measured in the southern ocean. Saturation anomalies were consistently negative at -36±7%. The observed undersaturations do not support recently published predictions of highly supersaturated antarctic waters, but instead suggest a net uptake of atmospheric CH_3Br by cold, productive oceans. The observations do not appear to be supported by known chemical degradation rates and present strong evidence for an unidentified, oceanic sink mechanism such as biological breakdown. The authors' estimate for the global, net, oceanic sink for atmospheric methyl bromide remains negative at -21 (-11 to -32) Gg/y. (Auth.)

51-2753

Mountain uplift and surface temperature changes.

Kitoh, A., *Geophysical research letters,* Jan. 15, 1997, 24(2), p.185-188, 20 refs.

Tectonics, Mountains, Topographic effects, Air water interactions, Atmospheric circulation, Surface temperature, Global change, Paleoclimatology, Computerized simulation

51-2754

CO_2 concentration of air trapped in GISP2 ice from the last glacial maximum-Holocene transition.

Smith, H.J., Wahlen, M., Mastroianni, D., Taylor, K.C., *Geophysical research letters,* Jan. 1, 1997, 24(1), p.1-4, 18 refs.

Ice cores, Glacier ice, Ice composition, Ice dating, Bubbles, Carbon dioxide, Atmospheric composition, Paleoclimatology, Global warming, Greenland

51-2755

Lateral viscosity variations and post-glacial rebound: effects on present-day VLBI baseline deformations.

Giunchi, C., Spada, G., Sabadini, R., *Geophysical research letters,* Jan. 1, 1997, 24(1), p.13-16, 27 refs.

Glaciation, Isostasy, Sea level, Earth crust, Tectonics, Geophysical surveys, Computerized simulation

51-2756

Polar temperature sensitivity to lunar forcing?

Shaffer, J.A., Cerveny, R.S., Balling, R.C., Jr., *Geophysical research letters,* Jan. 1, 1997, 24(1), p.29-32, Refs. p.31-32.

Paleoclimatology, Climatic factors, Models, Air temperature, Atmospheric circulation, Periodic variations, Heat transfer, Polar regions

The authors conduct an empirical study of polar sensitivity to climate forcing by comparing a high-quality, 17-year satellite-derived dataset of daily temperatures for 2.5° latitudinal bands to a known external forcing mechanism, the lunar phase cycle. The earth's polar regions display a temperature range of greater than 0.55°C over the course of a synodic (29.53 day) month. This lunar-influenced range in temperature is 25 times larger than a similarly computed range in aggregated global temperatures over a synodic month. Temperature variations between the polar and non-polar regions also produce a pronounced temporal shift in sensible heat transfer. Strong poleward transfer of heat dominates near the full moon but the transfer substantially weakens near the new moon. It is unlikely that this sensitivity can be explained by the type of polar forcing previously identified in GCM simulations and paleoclimatic reconstructions, because of the short duration of the lunar cycle. However, it does demonstrate a new and potentially important external influence on the polar regions' climates. (Auth. mod.)

51-2757

Phase transformations in sulfuric acid aerosols: implications for stratospheric ozone depletion.

Imre, D.G., Xu, J., Tridico, A.C., *Geophysical research letters,* Jan. 1, 1997, 24(1), p.69-72, 37 refs.

Ozone, Atmospheric composition, Aerosols, Stratosphere, Freezing points, Air temperature

Activation reactions of benign chlorine species (HCl, $ClONO_2$) on aerosols in the winter polar stratosphere set the stage for the springtime catalytic destruction of ozone leading to the antarctic ozone hole. Field observations have demonstrated the existence of both solid and liquid particles consisting of H_2SO_4, HNO_3, and H_2O. The exact freezing conditions and final composition of the solid aerosols remain the subject of investigations. The authors present laboratory observations of isolated individual sulfuric acid/water particles under stratospheric temperatures and water vapor pressures. The experiments demonstrate that this binary system would not freeze unless temperatures were below the water-ice frost point. Upon freezing, the authors observe $H_2SO_4 \cdot 8H_2O$, not the generally invoked $H_2SO_4 \cdot 4H_2O$. It is suggested that the water-rich octahydrate phase is likely to be one of the high relative humidity forms which is efficient in chlorine activation. (Auth.)

51-2758

Unusual characteristics of lower thermosphere prevailing winds at South Pole.

Portniagin, IU.I., Forbes, J.M., Makarov, N.A., *Geophysical research letters,* Jan. 1, 1997, 24(1), p.81-84, 7 refs.

Wind (meteorology), Atmospheric circulation, Velocity measurement, Wind direction, Geomagnetism, Antarctica—South Pole

Meteor radar measurements of meridional winds near 95 km altitude, along four orthogonal azimuth directions approximately 2° from the geographic South Pole, were made between Jan. 19, 1995,

and Jan. 26, 1996. The authors report analyses of the prevailing (daily mean) wind component covering the period from Jan. 19 through June 20, 1995. The observed phenomena include: a regular month-to-month migration in the phase of the s=1 quasi-stationary component of the wind field; during Apr., a 10-day period of strong net wind divergence from the pole; and evidence for upwelling associated with very high magnetic activity. It is speculated that the wind divergence event may be associated with the mesospheric penetration of momentum fluxes known to accompany intense wave 1 activity in the Southern Hemisphere during Apr. (Auth.)

51-2759

Impact of permafrost thawing on the carbon dynamics of tundra.

Waelbroeck, C., Monfray, P., Oechel, W.C., Hastings, S., Vourlitis, G., *Geophysical research letters,* Feb. 1, 1997, 24(3), p.229-232, 22 refs.

Permafrost surveys, Tundra soils, Carbon dioxide, Tundra climate, Climatic changes, Ground thawing, Frozen ground chemistry, Soil air interface, Global warming

51-2760

Hyperproductivity of the Ross Sea (Antarctica) polynya during austral spring.

Smith, W.O., Jr., Gordon, L.I., *Geophysical research letters,* Feb. 1, 1997, 24(3), p.233-236, 17 refs.

Marine biology, Plankton, Biomass, Oceanographic surveys, Antarctica—Ross Sea

The authors conducted a cruise to the Ross Sea polynya in Nov.-Dec., 1994 to measure the contribution of phytoplankton during the austral spring to the annual productivity of the region and found markedly enhanced levels of phytoplankton biomass. Chlorophyll concentrations were greater than 3 μg/l in mid-Nov. Particulate matter concentrations increased through time, and by early Dec. chlorophyll and particular carbon concentrations exceeded 10 μg/l and 53 μmol/l, respectively. Primary productivity also increased through time. Productivity based on nitrate disappearance averaged 1.52 g C/m^2/d, suggesting that the bloom's new production was also substantial. The Ross Sea polynya is the most southerly location in the Antarctic where phytoplankton growth is initiated this early and which supports such high standing stocks by early Dec. Inclusion of this production in a carbon budget for the region suggests that this area supports an annual production of 200 g C/m^2, the largest of any region in the southern ocean, and confirms its hyperproductive nature. (Auth. mod.)

51-2761

Potential impact of soot particles from aircraft exhaust on cirrus clouds.

Jensen, E.J., Toon, O.B., *Geophysical research letters,* Feb. 1, 1997, 24(3), p.249-252, 18 refs.

Airplanes, Condensation trails, Air pollution, Aerosols, Cloud cover, Cloud physics, Ice nuclei, Heterogeneous nucleation

51-2762

Multidecadal climate variability in the Greenland Sea and surrounding regions: a coupled model simulation.

Delworth, T.L., Manabe, S., Stouffer, R.J., *Geophysical research letters,* Feb. 1, 1997, 24(3), p.257-260, 17 refs.

Air ice water interaction, Air water interactions, Polar atmospheres, Atmospheric circulation, Ocean currents, Water transport, Sea water, Water temperature, Surface temperature, Salinity, Climatic changes, Computerized simulation, Greenland Sea

51-2763

Stagnation of ice stream C, West Antarctica by water piracy.

Anandakrishnan, S., Alley, R.B., *Geophysical research letters,* Feb. 1, 1997, 24(3), p.265-268, 23 refs.

Stream flow, Ice sheets, Drainage, Flow rate, Glacier flow, Antarctica—West Antarctica

The dynamic behavior of the West Antarctic ice sheet is of interest because of the possibility that it may change and cause rapid sea-level rise. Attention is focused on the fast-moving and rapidly responding ice streams that drain the ice sheet. One of these, ice stream C, largely stopped about a century ago, and some models for this shutdown postulate negative feedbacks that would tend to stabilize the ice-sheet. Here, new data are presented indicating that the slowdown of the ice stream is restricted to its lower part, and occurred because of loss of lubrication on localized "sticky spots" at the bed of the ice stream. The increased friction probably arises from a topographic accident of the glacier bed that has directed lubricating water to the neighboring ice stream B, together with slow drawdown of the ice sheet, rather than from any general stabilizing feedbacks. (Auth.)

51-2764

Cool tropical temperatures shift the global $\delta^{18}O$-T relationship: an explanation for the ice core δ^{18}-borehole thermometry conflict?

Boyle, E.A., *Geophysical research letters,* Feb. 1, 1997, 24(3), p.273-276, 19 refs.

Ice cores, Isotope analysis, Drill core analysis, Atmospheric composition, Ice composition, Air temperature, Paleoclimatology, Global change, Greenland

51-2765

Ozone measurements over McMurdo Station, Antarctica during spring 1994 and 1995.

Nardi, B., Deshler, T., Hervig, M.E., Oolman, L.D., *Geophysical research letters,* Feb. 1, 1997, 24(3), p.285-288, 14 refs.

Ozone, Stratosphere, Atmospheric composition, Air temperature, Antarctica—McMurdo Station

Ozone and temperature profiles were measured with balloon-borne instruments over McMurdo Station from late Aug. to late Oct. in 1994 and in 1995. Minimum column ozone values of 138 DU and 139 Du were measured, reduced from initial measurements in late Aug. of 272 DU and 256 DU, respectively. These minima are higher than the record low measurement from McMurdo taken in Oct. 1993 (130 DU), but lower than all other years since 1986 when ozone measurements were initiated at McMurdo. In 1994 and 1995, as in previous years, the onset of ozone recovery began mid-to-late Oct. above 20 km. Below 14 km ozone concentrations have returned to pre-Pinatubo levels. Between 16-22 km they are near, and in 1995 often lower than, the record low levels set in 1993. In late Aug. of 1995, the total and 12-20 km column ozone were also often observed to be near or lower than that for the same period of all previous years since 1986. By early Oct. 1995, almost complete ozone depletion was experienced uniformly over the altitude region 14.5-19.5 km. (Auth.)

51-2766

Assessment of the accuracy of 14.5 years of Nimbus 7 TOMS Version 7 ozone data by comparison with the Dobson network.

McPeters, R.D., Labow, G.J., *Geophysical research letters,* Dec. 15, 1996, 23(25), p.3695-3698, 11 refs.

Ozone, Mathematical models, Data processing, Meteorological instruments, Spacecraft, Solar radiation, Antarctica

A Version 7 algorithm and calibration have been applied to the 14.5 year Nimbus 7 TOMS ozone record (1978-1993). The ozone retrieval algorithm has been significantly improved for cloudy conditions and for high solar zenith angles, and the radiative transfer used in the algorithm is more accurate. New calibration techniques have been used that produce a very stable data set even after 1990 when TOMS degradation became significant. TOMS ozone now agrees with average ozone from an ensemble of 30 Northern Hemisphere ground stations (Dobsons and Brewers) to within 1% throughout most of the 14.5 year record. The time-dependent drift relative to Dobson is 0.29% per decade through the end of the data record. There is almost no solar zenith angle dependence in the comparison for angles below about 80°, but data should be used with caution for larger solar zenith angles. There is also a residual total ozone dependence in the TOMS-Dobson difference, of about 1% per 100 DU. (Auth.)

51-2767

Long-term ozone trends derived from the 16-year combined Nimbus 7/Meteor 3 TOMS Version 7 record.

McPeters, R.D., Hollandsworth, S.M., Flynn, L.E., Herman, J.R., Seftor, C.J., *Geophysical research letters,* Dec. 15, 1996, 23(25), p.3699-3702, 15 refs.

Meteorological instruments, Spacecraft, Ozone, Mathematical models, Data processing, Seasonal variations, Solar radiation, Antarctica

Ozone measurements from the Nimbus 7 TOMS instrument, which operated from Nov. 1978 through early May 1993, have been extended through Dec. 1994 using data from the TOMS instrument on-board the Russian Meteor 3 satellite. Both TOMS data records have recently been recalibrated, and then reprocessed using the Version 7 retrieval algorithm. Long-term trend estimates obtained from a multiple regression analysis show ozone losses in the extended data record similar to those reported in previous studies using Version 6 TOMS and SBUV data, and ground-based Dobson data. Ozone continues to decline through the end of 1994, with the most significant ozone losses occurring in the high southern latitudes during Oct. (-20% per decade) and in the northern mid- to high-latitudes during Mar./Apr. (-6 to -8% per decade). There is no significant ozone trend in the tropics. Annual-average trends derived from the Nimbus 7 Version 7 data are 0-2.5% per decade less negative than those derived over the same time period using Version 6 data. (Auth.)

51-2768

Cold stratospheric winters 1994/1995 and 1995/1996.

Naujokat, B., Pawson, S., *Geophysical research letters,* Dec. 15, 1996, 23(25), p.3703-3706, 9 refs.

Polar atmospheres, Polar stratospheric clouds, Cloud physics, Atmospheric pressure, Atmospheric circulation, Atmospheric composition, Air temperature, Ozone

51-2769

Densities and refractive indices of $H_2SO_4/HNO_3/H_2O$ solutions to stratospheric temperatures.

Luo, B.P., Krieger, U.K., Peter, T., *Geophysical research letters,* Dec. 15, 1996, 23(25), p.3707-3710, 22 refs.

Polar atmospheres, Atmospheric composition, Stratosphere, Air temperature, Aerosols, Polar stratospheric clouds, Cloud physics, Refractivity

51-2770

Enhanced atmospheric transport of soil derived organic matter in spring over the high Arctic.

Kawamura, K., Yanase, A., Eguchi, T., Mikami, T., Barrie, L.A., *Geophysical research letters,* Dec. 15, 1996, 23(25), p.3735-3738, 15 refs.

Polar atmospheres, Atmospheric circulation, Atmospheric composition, Soil air interface, Air pollution, Dust, Aerosols

51-2771

Accuracy of arctic stratospheric temperature analyses and the implications for the prediction of polar stratospheric clouds.

Knudsen, B.M., *Geophysical research letters,* Dec. 15, 1996, 23(25), p.3747-3750, 10 refs.

Polar atmospheres, Stratosphere, Air temperature, Polar stratospheric clouds, Cloud physics, Ozone, Weather forecasting, Statistical analysis

51-2772

Sensitivity of post-glacial sea level to viscosity structure and ice-load history for realistically parameterized viscosity profiles.

Fang, M., Hager, B.H., *Geophysical research letters,* Dec. 15, 1996, 23(25), p.3787-3790, 25 refs.

Glaciation, Isostasy, Sea level, Earth crust, Tectonics, Global change, Geochronology, Computerized simulation

51-2773

Field investigation of winter thermo- and hydrodynamics in a small Karelian lake.

Bengtsson, L., et al, *Limnology and oceanography,* Nov. 1996, 41(7), p.1502-1513, 23 refs.

Lakes, Hydrodynamics, Thermodynamics, Solar radiation, Russia—Vendyurskoe, Lake

51-2774

Extreme supersaturation of nitrous oxide in a poorly ventilated antarctic lake.

Priscu, J.C., Downes, M.T., McKay, C.P., *Limnology and oceanography,* Nov. 1996, 41(7), p.1544-1551, 46 refs.

Lakes, Ice cover effect, Hydrology, Antarctica—Taylor Valley, Antarctica—Bonney, Lake

Lake Bonney, a permanently ice-covered antarctic lake, has a mid-depth maximum N_2 concentration of 41.6 μM N in its east lobe, representing the highest level yet reported for a natural aquatic system. Atmospheric N_2O over the lake was 45% above the global average, indicating that this lake is an atmospheric source of N_2O. Apparent N_2O production (ANP) was correlated with apparent oxygen utilization (AOU), and denitrification was not detectable, implying that nitrification is the primary source for this gas. The slope of a regression of ANP on AOU revealed that potential N_2O production per unit of potential O_2 consumed in the east lobe of Lake Bonney is at least two orders of magnitude greater than reported for the ocean. The maximum yield ratio for N_2O [ANP/(NO_2^- + NO_3^-)] in Lake Bonney is 26%, i.e. 1 atom of N appears in N_2O for every 3.9 atoms appearing in oxidized N, which exceeds previous reports for pelagic systems, being similar to values from reduced sediments. Areal N_2O flux from the lake to the atmosphere is >200 times the areal flux reported for oceanic systems; most of this gas apparently enters the atmosphere through a small moat that occupies ca. 3% of the surface of the lake and exists for ca. 10 weeks in summer. (Auth.)

51-2775

Brewer-Dobson circulation in the light of high altitude *in situ* aircraft observations.

Tuck, A.F., et al, *Royal Meteorological Society. Quarterly journal,* Jan. 1997 Part A, 123(537), p.1-69, Refs. p.63-69.

Atmospheric circulation, Atmospheric composition, Chemical composition, Stratosphere, Humidity

Fast response *in situ* measurements of a suite of chemical species made from the NASA ER2 high altitude aircraft, between 60°N and 70°S at potential temperatures up to 530 K from Mar. to Nov. 1994 at longitudes 115°W to 150°E, are considered for the view they offer of the Brewer-Dobson circulation in the lower stratosphere and upper troposphere. In the Southern Hemisphere, where most of the flights occurred, comparisons are made with measurements taken in Aug./Sep. 1987 at longitudes 120°W to 60°W to examine temporal and longitudinal differences. Interpretations made suggest conceptual modifications to the simple construct of advection in a two-dimensional long-term mean. (Auth.)

51-2776

Comment on "Electrical resistivity sounding of the East Antarctic ice sheet" by Sion Shabtaie and Charles R. Bentley and Reply.

Wolff, E.W., Shabtaie, S., Bentley, C.R., *Journal of geophysical research,* Dec. 10, 1996, 101(B12), p.27,735-27,740, 8 refs.

Ice cores, Ice crystals, Ice electrical properties, Impurities, Antarctica—Charlie, Dome

The disputing author disagrees with conclusions drawn in the original paper (see F-52509 / 49-3914) that ice resistivities are controlled by ice crystal size variations rather than by ice impurities content. He then cites reasons for the disagreement, concluding that once corrections are made for temperature and density, impurity content controls the conductivity of polar ice at both low and high frequencies. Authors of the original paper refute the analysis of the disputing author, citing the incapability of electrical conductivity to produce reliable data since it measures electrical current rather than conductivity, and that this condition has been known for more than 80 years.

51-2777

Isothermal flow of an anisotropic ice sheet in the vicinity of an ice divide.

Mangeney, A., Califano, F., Castelnau, O., *Journal of geophysical research,* Dec. 10, 1996, 101(B12), p.28,189-28,204, 57 refs.

Anisotropy, Ice creep, Ice thermal properties, Glacier flow, Analysis (mathematics), Ice mechanics

51-2778

Evidence of currently-used pesticides in air, ice, fog, seawater and surface microlayer in the Bering and Chukchi Seas.

Chemiak, S.M., Rice, C.P., McConnell, L.L., *Marine pollution bulletin,* May 1996, 32(5), p.410-419, 37 refs.

Polar atmospheres, Marine atmospheres, Ocean environments, Air pollution, Water pollution, Atmospheric circulation, Atmospheric composition, Ice composition, Impurities, Sea water, Fog

51-2779

Mechanical properties and freezing and thawing resistance of non-air-entrained, air-entrained, and air-entrained superplasticized concrete using ASTM Test C 666, Procedures A and B.

Malhotra, V.M., *Cement, concrete, and aggregates,* Summer 1982, 4(1), p.3-23, 11 refs.

Concrete freezing, Concrete strength, Concrete durability, Concrete admixtures, Air entrainment, Water cement ratio, Frost resistance, Freeze thaw tests

51-2780

Freezing of water and benzene in porous Vycor glass.

Hodgson, C., McIntosh, R., *Canadian journal of chemistry,* 1960, Vol.38, p.958-971, 18 refs.

Ice formation, Porous materials, Hygroscopic water, Adsorption, Capillarity, Liquid phases, Frozen liquids, Liquid solid interfaces, Interfacial tension, Phase transformations

51-2781

Integrating neural networks and rule based systems to build an avalanche forecasting system.

Schweizer, M., Föhn, P.M.B., Schweizer, J., IASTED International Conference on Artificial Intelligence, Expert Systems and Neural Networks, Zurich, Switzerland, July 4-6, 1994. Proceedings, Calgary, Alberta, International Association of Science and Technology for Development (IASTED), 1994, p.1-4, 6 refs.

Avalanche forecasting, Snow cover stability, Computerized simulation, Data processing

51-2782

Controls on calving rate and basal sliding: observations from Columbia Glacier, Alaska, prior to and during its rapid retreat, 1976-1993.

Van der Veen, C.J., *Ohio State University. Byrd Polar Research Center. BPRC report,* 1995, No.11, 72p., 46 refs.

Glacier surveys, Glacier flow, Glacier oscillation, Glacier ablation, Glacier tongues, Basal sliding, Calving, United States—Alaska—Columbia Glacier

51-2783

Late winter snow and ice characteristics of first-year floes in the Bellingshausen and Amundsen Seas, Antarctica: results of investigations during R.V. *Nathaniel B. Palmer* Cruise NBP 93-5 in August and September 1993.

Jeffries, M.O., et al, *Alaska. University. Geophysical Institute. Report,* [1997], UAG-R-325, 51p. + append., 60 refs.

Ice surveys, Sea ice distribution, Ice cover thickness, Ice floes, Snow ice interface, Ice growth, Ice structure, Ice density, Ice salinity, Ice temperature, Snow samplers, Core samplers, Antarctica—Bellingshausen Sea, Antarctica—Amundsen Sea

In Aug. and Sep. 1993, the R.V. *Nathaniel B. Palmer* operated for 37 days in the pack ice of the Bellingshausen and Amundsen seas supporting a sea ice research program, which included snow cover characterization, snow and ice thickness measurements and ice core analysis. The objective of the study was to improve the knowledge of the conditions and processes that contribute to first-year sea ice development and ice thickness variability in this region, and their impact on active microwave backscatter from the ice. The majority of snow depth values (76%) ranged from 0.05-0.35 m. The mean snow depth value was 0.23 m. The majority of ice thickness values (62%) ranged from 0.3-0.8 m. The mean ice thickness was 0.90 m. The snow ice layers had a mean thickness of 0.2 m and indicated that, by the end of winter, the thermodynamic development of the ice cover was dominated by seawater flooding of the snow/ice interface and snow ice formation. Snow ice layers were composed of 7-13% snow, which contributed to 2-4% of the total ice mass. (Auth. mod.)

51-2784

Bureau of Mines publications on Alaska: a bibliography. *U.S. Bureau of Land Management. Alaska State Office. BLM-Alaska open file report,* Nov. 1996, No.63, 125p., Citations p.1-49. The U.S. Bureau of Mines was abolished and its personnel and functions were transferred to the Bureau of Land Management in Jan. 1996.

Exploration, Geological surveys, Mining, Minerals, Natural resources, Bibliographies, United States—Alaska

51-2785

Jan Mayen Current from 1989 and 1990 summer data.

Stone, M.D., Monterey, CA, U.S. Naval Postgraduate School, 1996, 125p., M.S. thesis. 41 refs.

Oceanographic surveys, Hydrography, Ocean currents, Water transport, Sea water, Water temperature, Salinity, Greenland Sea

51-2786

Ice jam dynamics.

Zufelt, J.E., Ettema, R., MP 4003, *Iowa. University. Iowa Institute of Hydraulic Research. IIHR technical report,* July 1996, No.380, 203p., 27 refs. Funded by the U.S. Army Cold Regions Research and Engineering Laboratory. For Ph.D. thesis of same title see 51-2133.

River ice, Ice jams, Freezeup, Ice breakup, Ice friction, Ice pressure, Ice pileup, Ice cover thickness, Ice forecasting, Ice water interface, River flow, Flood forecasting, Mathematical models, Computer programs

51-2787

Thermal maturation, potential source rocks and hydrocarbon generation in Mesozoic rocks, Lougheed Island area, central Canadian Arctic archipelago.

Gentzis, T., Goodarzi, F., Embry, A.F., *Marine and petroleum geology,* Dec. 1996, 13(8), p.879-905, 34 refs.

Marine geology, Pleistocene, Hydrocarbons, Classifications, Arctic landscapes, Geochemistry, Geothermal prospecting, Rock properties, Stratigraphy, Subsidence, Sampling, Canada—Northwest Territories—Lougheed Island

51-2788

Gas hydrate and free gas indications within the Cenozoic succession of the Bjørnøya Basin, western Barents Sea.

Laberg, J.S., Andreassen, K., *Marine and petroleum geology,* Dec. 1996, 13(8), p.921-940, 51 refs.

Hydrates, Natural gas, Exploration, Seismic surveys, Offshore drilling, Well logging, Marine geology, Bottom sediment, Stratigraphy, Barents Sea

51-2789

Question of Antarctica: State of the environment in Antarctica. Report of the Secretary-General.

United Nations. General Assembly, *United Nations document,* Sep. 20, 1996, A/51/390, 35p., 9 refs.

International cooperation, Meetings, Marine biology, Environmental protection, Sea ice, Air pollution

The present report has been prepared in response to General Assembly resolution 49/80 of Dec. 15, 1994 on the question of Antarctica and, in particular, to paragraph 2 of that resolution, in which the Assembly calls for a report on the information supplied by the Antarctic Treaty Consultative Parties on their activities in Antarctica to be submitted to the General Assembly at its fifty-first session. The report also updates previous reports to the General Assembly on the state of the environment in Antarctica, providing a synopsis of some recent findings. The emphasis of the report is on environmental issues.

51-2790

Antarctic Science and Policy: Interdisciplinary Research Education (ASPIRE).

Berkman, P.A., *Ohio State University. Byrd Polar Research Center. Report,* 1997, BPRC No.13, 70p., Refs. p.57-70.

Research projects, Education, Environmental protection, Antarctica

The purpose of the report is to illustrate an interdisciplinary approach for teaching Earth System Science Education (ESSE) through group decision-making activities. This educational approach has been applied successfully in an interdisciplinary capstone course on Antarctic Marine Ecology and Policy that has been taught at universities in the United States since 1982. In this course, each student becomes an "ambassador" to an Antarctic Treaty nation with the task of recommending a practical and clearly defined solution that would mitigate a specific human impact in the antarctic marine ecosystem. These solutions are discussed and refined in working groups throughout the course to create the formal recommendations that are debated at the end of the term in a Mock Antarctic Treaty Consultative Meeting. The effectiveness of this interdisciplinary activity in teaching ESSE courses is assessed with regard to several student case studies.

51-2791

Managing the antarctic environment: from observations to policy. A workshop report.

Jezek, K.C., ed, Tipton-Everett, L., ed, *Ohio State University. Byrd Polar Research Center. Report,* 1995, BPRC No.12, 42p., Refs. p.34-35.

Research projects, Remote sensing, International cooperation, Environmental protection, Environmental impact, Human factors, Air pollution, Ocean environments, Instruments, Antarctica

The workshop was convened at the Byrd Polar Research Center on July 10-12, 1995. The primary objectives of the workshop were to review the status of environmental policies currently applied to Antarctica, to identify key physical, chemical and biological variables that can serve as indicators of human impacts and to identify requirements that spaceborne sensors must meet to be usefully applied as antarctic environmental monitoring tools. An additional objective was to explore how remote sensing data must be manipulated in order to be useful to policy makers. Over 50 participants with expertise in antarctic policy, science, and commercial enterprises attended the meeting. This report summarizes the findings of eight panels which addressed policy issues, the marine and terrestrial environments, science support, tourism, human impact, and remote sensing. Major conclusions reached by the panels are discussed. (Auth. mod.)

51-2792
Cape Roberts Project: Antarctic stratigraphic drilling. Proceedings of a meeting to consider the project science plan and potential contributions by the U.S. science community, 6-7 March, 1994.
Webb, P.N., ed, Wilson, G.S., ed, *Ohio State University. Byrd Polar Research Center. Report,* 1995, BPRC No.10, 117p., Refs. p.81-93.
Research projects, Marine geology, Glacial geology, Geological surveys, Geophysical surveys, Drilling, Antarctica—Roberts, Cape, Antarctica—Ross Sea
This report provides a record of the proceedings of the United States Cape Roberts Project (CRPUS) workshop held at the Ohio State University in Mar. 1994. Some 43 scientists from U.S. institutions contributed to statements of interest presented by the 31 scientists who attended the workshop. The primary interest areas were geophysics, tectonic history, structural and igneous geology; stratigraphy, sedimentology, mineralogy, geochemistry, down-hole geophysics, and magnetostratigraphy; and marine-terrestrial paleontology and biostratigraphy, paleoclimate, and paleoceanography. Presented here are the highlights of the principal points of discussion, special issues, statements, and recommendations.

51-2793
Vertical distribution and seasonal variation in ice algae biomass in coastal sea ice off Zhongshan Station, East Antarctica.
He, J.F., Chen, B., *Antarctic research,* Dec. 1996, 7(2), p.150-163, Refs. p.161-163. For Chinese original see 50-3642 or 24B-54582.
Sea ice, Ice cover thickness, Algae, Biomass, Antarctica—Zhongshan Station
Algal communities in coastal sea ice off Zhongshan Station were monitored from Apr. to Dec. 1992. The maximum thickness of ice cover was 1.74 m (Nov.-Dec.). Brown layers occurred in 2-5 cm of the ice bottom in late Apr. and Nov., with chlorophyll *a* peak values of 360.7 and 2810 mg/m^3, respectively. The integrated chlorophyll *a* values ranged from 1.17 to 59.7 mg/m^2, with the peak occurring in Nov. when ice algae bloomed, and the values never exceeded 6 mg/m^2 before mid-Oct. The highest value occurred in Apr. Most of the biomass was concentrated in the bottom ice. The dominant diatoms were composed of *Nitzschia lecointei. N. barkleyi.* and *N. cylindrus* in the fall, and *Amphiprora kjellmanii. Berkeleya rutilans.* and *N. lecointei* in the spring. (Auth. mod.)

51-2794
Annual cycle of the surface energy balance of antarctic blue ice.
Bintanja, R., Jonsson, S., Knap, W.H., *Journal of geophysical research,* Jan. 27, 1997, 102(D2), p.1867-1881, 42 refs.
Weather stations, Models, Radiation, Wind velocity, Air temperature, Ice sheets, Ice temperature, Glacier heat balance, Ice heat flux, Antarctica—Queen Maud Land
A 15-month meteorological data set was obtained from an automatic weather station over a blue ice area in Queen Maud Land. The meteorological measurements are used as input for a surface energy balance model in order to compute the hourly varying surface fluxes and the (sub)surface temperatures to a depth of 10 m. The model reproduces reasonably well the directly measured temperatures in the upper meter of ice. Model results show that the net shortwave radiation is the largest positive term in the annual mean energy budget (42.2 W/m^2). Other positive fluxes are the downward sensible heat flux (12.1 W/m^2) and the upward subsurface energy flux (0.2 W/m^2). Energy is lost by net longwave radiation (-49/1 W/m^2) and the upward directed latent heat flux (-5.0 W/m^2). An analysis is made of the annual cycle of the surface heat fluxes on the basis of daily, monthly, and seasonally mean values. In addition, there are calculations of the surface energy budget for two distinctly different weather regimes, which are typical for this region. Finally, it is demonstrated that the annual cycle of the turbulent fluxes can be explained in terms of the limiting values of the Bowen ratio. (Auth. mod.)

51-2795
Crustal structure of northern Baffin Bay: Seismic refraction results and tectonic implications.
Reid, I., Jackson, H.R., *Journal of geophysical research,* Jan. 10, 1997, 102(B1), p.523-542, 24 refs.
Geologic structures, Tectonics, Seismic refraction, Earth crust, Canada—Baffin Bay

51-2796
Basal conditions on Rutford Ice Stream, West Antarctica, from seismic observations.
Smith, A.M., *Journal of geophysical research,* Jan. 10, 1997, 102(B1), p.543-552, 52 refs.
Ice sheets, Seismic refraction, Ice creep, Glacier flow, Glacier beds, Basal sliding, Antarctica—Ellsworth Mountains, Antarctica—Fletcher Ice Rise
A seismic reflection profile, perpendicular to the ice flow direction has been acquired on Rutford Ice Stream. An interpretation of both the amplitude and phase of the seismic reflections from the ice-bed interface has been made to investigate the properties of the sub-ice material. Multiple reflections from the ice-bed interface on a number of seismic wide-angle lines allowed a calibration of the reflection coefficient at the bed. This enabled the acoustic impedance of the bed material to be calculated from the seismic reflection data. Almost three quarters of the ice stream bed at this site appears to be saturated, deforming sediments. The rest of the bed is probably also saturated sediments, but they are not deforming to any significant degree. Ice flow could include a combination of subglacial deformation and basal sliding. Localized regions which support disproportionately high amounts of basal shear stress may also occur. From the seismic data, it is not possible to apportion relative amounts of restraint to these different processes. There does not appear to be any correlation between the different sections identified on the ice stream bed with either satellite images or nearby surface velocity data. (Auth. mod.)

51-2797
Global geodetic signatures of the antarctic ice sheet.
James, T.S., Ivins, E.R., *Journal of geophysical research,* Jan. 10, 1997, 102(B1), p.605-633, 74 refs.
Ice sheets, Mass balance, Ablation, Models, Sea level, Glacier mass balance
Four scenarios of present day antarctic ice sheet mass change are developed from comprehensive reviews of the available glaciological and oceanographic evidence. The gridded scenarios predict widely varying contributions to secular sea level change ranging from -1.1 to 0.45 mm/yr, and predict polar motion and time-varying low-degree gravitational coefficients J_l that differ significantly from earlier estimates. A reasonably linear relationship between the rate of sea level change from Antarctica and the predicted antarctic J_l is found for the four scenarios. This linearity permits a series of forward models to be constructed that incorporate the effects of ice mass changes in Antarctica, Greenland, and distributed smaller glaciers, as well as postglacial rebound (assuming the ICE-3G deglaciation history), with the goal of obtaining optimum reconciliation between observed constraints on J_l and sea level rise. (Auth. mod.)

51-2798
Magnetostratigraphy of the Late Cretaceous to Eocene Sverdrup Basin: Implications for heterochroneity, deformation, and rotations in the Canadian Arctic archipelago.
Tarduno, J.A., Cottrell, R.D., Wilkison, S.L., *Journal of geophysical research,* Jan. 10, 1997, 102(B1), p.723-746, 67 refs.
Stratigraphy, Magnetic surveys, Geochronology, Canada—Northwest Territories—Sverdrup Basin

51-2799
Climatological significance of δ^{18}O in north Tibetan ice cores.
Yao, T.D., Thompson, L.G., Mosley-Thompson, E., Yang, Z.H., Zhang, X.P., Lin, P.N., *Journal of geophysical research,* Dec. 27, 1996, 101(D23), p.29,531-29,537, 43 refs.
Ice cores, Oxygen isotopes, Air temperature, China—Tibetan Plateau

51-2800
Charging in ice-ice collisions as a function of the ambient temperature and the larger particle average temperature.
Avila, E.E., Aguirre Varela, G.G., Caranti, G.M., *Journal of geophysical research,* Dec. 27, 1996, 101(D23), p.29,609-29,614, 13 refs.
Ice electrical properties, Charge transfer, Ice crystal collision, Air temperature, Cloud electrification, Laboratory techniques

51-2801
Occurrence patterns of *F* layer patches over the north magnetic pole.
McEwen, D.J., Harris, D.P., *Radio science,* May-June 1996, 31(3), p.619-628, 20 refs.
Atmospheric electricity, Polar atmospheres, Ionization, Geomagnetism, Seasonal variations, Scintillation, Magnetic anomalies, Canada—Northwest Territories—Eureka

51-2802
Spectral structure of auroral *F* layer patches.
Erukhimov, L.M., Murav'eva, N.V., Miasnikov, E.N., Evstaf'ev, O.V., Kosolapenko, V.I., *Radio science,* May-June 1996, 31(3), p.629-633, 15 refs.
Atmospheric electricity, Geomagnetism, Scintillation, Ionization, Polar atmospheres, Electric fields, Turbulence, Spectra, Remote sensing, Russia—Verkhnetulomskiĭ

51-2803
Relationship of theoretical patch climatology to polar cap patch observations.
Bowline, M.D., Sojka, J.J., Schunk, R.W., *Radio science,* May-June 1996, 31(3), p.635-644, 34 refs.
Atmospheric electricity, Geomagnetism, Photometry, Electric fields, Convection, Ionization, Polar atmospheres, Climatology, Canada—Northwest Territories—Eureka

51-2804
Polar patches and the "tongue of ionization".
Steele, D.P., Cogger, L.L., *Radio science,* May-June 1996, 31(3), p.667-677, 27 refs.
Polar atmospheres, Atmospheric electricity, Ionization, Electric fields, Geomagnetism, Convection, Velocity measurement, Photometry, Imaging, Canada—Northwest Territories—Eureka

51-2805
Glaciotectonic deformation during the Elsterian ice-sheet advance at the northeastern margin of the Sudetic Foreland, SW Poland.
Krzyszkowski, D., *Boreas,* Dec. 1996, 25(4), p.209-226, 29 refs.
Pleistocene, Glacial geology, Tectonics, Bedrock, Quaternary deposits, Earth crust, Ice push, Sedimentation, Ice solid interface, Deformation, Shear flow, Stratigraphy, Poland—Sudetic Foreland

51-2806
Sedimentary and tectonic development of a high-arctic, thrust-moraine complex: Comfortlessbreen, Svalbard.
Huddart, D., Hambrey, M.J., *Boreas,* Dec. 1996, 25(4), p.227-243, 47 refs.
Glacial geology, Marine geology, Geomorphology, Tectonics, Moraines, Quaternary deposits, Deformation, Sedimentation, Grounded ice, Ice push, Ice edge, Lithology, Norway—Svalbard

51-2807
Retreat of the Barents Sea ice sheet on the western Svalbard margin.
Svendsen, J.I., Elverhøi, A., Mangerud, J., *Boreas,* Dec. 1996, 25(4), p.244-256, 60 refs.
Marine geology, Pleistocene, Ice sheets, Glacier oscillation, Ice edge, Subpolar regions, Paleoecology, Sedimentation, Stratigraphy, Drill core analysis, Radioactive age determination, Barents Sea, Norway—Svalbard

51-2808
Oxygen-isotope record of Late-Glacial climatic change in western Ireland.
Ahlberg, K., Almgren, E., Wright, H.E., Jr., Ito, E., Hobbie, S., *Boreas,* Dec. 1996, 25(4), p.257-267, 42 refs.
Pleistocene, Paleoclimatology, Paleoecology, Palynology, Lacustrine deposits, Climatic changes, Isotope analysis, Oxygen isotopes, Sedimentation, Remanent magnetism, Radioactive age determination, Ice cores, Ice melting, Cooling, Correlation, Ireland

51-2809
Biomarker distribution in the lacustrine shales of the Upper Triassic-Lower Jurassic Kap Stewart Formation, Jameson Land, Greenland.
Krabbe, H., *Marine and petroleum geology,* Nov. 1996, 13(7), p.741-754, 40 refs.
Marine geology, Pleistocene, Lacustrine deposits, Stratigraphy, Sampling, Rock properties, Hydrocarbons, Reservoirs, Exploration, Chemical analysis, Organic nuclei, Sedimentation, Greenland—Jameson Land

51-2810
Plume tectonics as a cause of mass wasting on the southeast Greenland continental margin.
Clift, P., *Marine and petroleum geology,* Nov. 1996, 13(7), p.771-780, 63 refs.
Marine geology, Pleistocene, Tectonics, Subsidence, Earth crust, Magma, Mass transfer, Sediment transport, Erosion, Geomorphology, Seismic surveys, Stratigraphy, Greenland

51-2811

Detection and mapping of Alaskan wildfires using a spaceborne imaging radar system.

Bourgeau-Chavez, L.L., Harrell, P.A., Kasischke, E.S., French, N.H.F., *International journal of remote sensing,* Jan. 20, 1997, 18(2), p.355-373, 26 refs.

Tundra terrain, Tundra soils, Forest fires, Geophysical surveys, Damage, Detection, Spaceborne photography, Radiometry, Synthetic aperture radar, Sensor mapping, Environmental impact, Backscattering, United States—Alaska

51-2812

Backscattering properties of a wet snow cover derived from DEM corrected ERS-1 SAR data.

Guneriussen, T., *International journal of remote sensing,* Jan. 20, 1997, 18(2), p.375-392, 28 refs.

Snow surveys, Alpine landscapes, Spaceborne photography, Snow cover distribution, Synthetic aperture radar, Backscattering, Wet snow, Snow electrical properties, Statistical analysis, Image processing, Slope orientation, Correlation, Norway

51-2813

Scaling-up point snow depth data in the U.K. for comparison with SSM/I imagery.

Atkinson, P.M., Kelly, R.E.J., *International journal of remote sensing,* Jan. 20, 1997, 18(2), p.437-443, 19 refs.

Snow surveys, Snow cover distribution, Snow depth, Spaceborne photography, Radiometry, Microwaves, Scattering, Image processing, Statistical analysis, Correlation

51-2814

Deposition of atmospheric heavy metals to the Greenland ice sheet from the 1783-1784 volcanic eruption of Laki, Iceland.

Hong, S.M., Candelone, J.P., Boutron, C.F., *Earth and planetary science letters,* Nov. 1996, 144(3-4), p.605-610, 19 refs.

Atmospheric composition, Aerosols, Air pollution, Volcanoes, Volcanic ash, Metals, Mass transfer, Fallout, Ice sheets, Ice cores, Ice composition, Sampling, Iceland—Laki, Greenland—Summit

51-2815

Optical study of roughening transition on ice I_h (1010) planes under pressure.

Maruyama, M., Kishimoto, Y., Sawada, T., *Journal of crystal growth,* Mar. 1997, 172(3-4), p.521-527, 16 refs.

Ice physics, High pressure ice, Ice crystal growth, Ice crystal structure, Surface roughness, Supercooling, Ice melting, Ice water interface, High pressure tests, Temperature effects, Imaging, Phase transformations, Interfacial tension

51-2816

Infrared characterization of amorphous and polycrystalline D_2O ice on controlled wettability self-assembled alkanethiolate monolayers.

Engquist, I., Lundström, I., Liedberg, B., Parikh, A.N., Allara, D.L., *Journal of chemical physics,* Feb. 22, 1997, 106(8), p.3038-3048, 61 refs.

Ice physics, Amorphous ice, Phase transformations, Deuterium oxide ice, Ice spectroscopy, Infrared spectroscopy, Spectra, Wettability, Ice solid interface, Substrates, Monomolecular films, Ice optics, Thermodynamic properties, Simulation

51-2817

Ultraslow nonequilibrium dynamics in supercooled glycerol by stimulated Brillouin gain spectroscopy.

Miller, R.S., MacPhail, R.A., *Journal of chemical physics,* Feb. 22, 1997, 106(8), p.3393-3401, 42 refs.

Supercooling, Liquid cooling, Temperature effects, Polymers, Molecular energy levels, Phase transformations, Viscosity, Spectroscopy, Light scattering, Enthalpy

51-2818

D_2O ice on controlled wettability self-assembled alkanethiolate monolayers: cluster formation and substrate-adsorbate interaction.

Engquist, I., Liedberg, B., *Journal of physical chemistry,* Dec. 19, 1996, 100(51), p.20,089-20,096, 53 refs.

Ice physics, Deuterium oxide ice, Wettability, Ice solid interface, Adsorption, Substrates, Ice spectroscopy, Monomolecular films, Hydrogen bonds, Molecular structure, Amorphous ice, Vibration

51-2819

Simultaneous presence of orbital inclination and eccentricity in proxy climate records from Ocean Drilling Program Site 806.

Muller, R.A., MacDonald, G.J., *Geology,* Jan. 1997, 25(1), p.3-6, 16 refs.

Paleoclimatology, Marine deposits, Sedimentation, Paleoecology, Drill core analysis, Geochronology, Glacier oscillation, Ice volume, Insolation, Climatic changes, Spectra, Pacific Ocean

51-2820

Intensification of the Asian monsoon and a chemical weathering event in the late Miocene-early Pliocene: implications for late Neogene climate change.

Filippelli, G.M., *Geology,* Jan. 1997, 25(1), p.27-30, 44 refs.

Paleoclimatology, Climatic changes, Terraces, Precipitation (meteorology), Geochemical cycles, Carbon dioxide, Weathering, Sedimentation, Geochronology, Climatic factors, Himalaya Mountains

51-2821

New absolute time scale for the Quaternary climate in the Chinese loess region by grain-size analysis.

Vandenberghe, J., An, Z.S., Nugteren, G., Lu, H.Y., Van Huissteden, K., *Geology,* Jan. 1997, 25(1), p.35-38, 23 refs.

Paleoclimatology, Quaternary deposits, Loess, Grain size, Sedimentation, Sampling, Geochronology, Stratigraphy, Geomagnetism, Correlation, China—Loess Plateau

51-2822

Miocene to present vegetation changes: a possible piece of the Cenozoic cooling puzzle.

Dutton, J.F., Barron, E.J., *Geology,* Jan. 1997, 25(1), p.39-41, 22 refs.

Paleoclimatology, Climatic changes, Cooling, Temperature variations, Paleoecology, Vegetation patterns, Glacier oscillation, Temperature effects, Models, Simulation, Tundra vegetation

51-2823

Paleoclimatic significance of the stratigraphic occurrence of photosynthetic biomarker pigments in the Nordic seas.

Rosell-Melé, A., Koç, N., *Geology,* Jan. 1997, 25(1), p.49-52, 32 refs.

Paleoclimatology, Paleoecology, Chlorophylls, Marine deposits, Stratigraphy, Photosynthesis, Diagenesis, Drill core analysis, Glacier oscillation, Radioactive age determination, Ice rafting, Greenland Sea, Norwegian Sea, Iceland Sea

51-2824

Late Quaternary vegetation dynamics and hydroseral development in a *Thuja occidentalis* swamp in southern Ontario.

Bunting, M.J., Warner, B.G., Aravena, R., *Canadian journal of earth sciences,* Oct. 1996, 33(10), p.1439-1456, With French summary. 41 refs.

Paleoecology, Wetlands, Quaternary deposits, Palynology, Vegetation patterns, Revegetation, Geomorphology, Stratigraphy, Drill core analysis, Radioactive age determination, Correlation, Canada—Ontario

51-2825

***Ellesmeris sphenopteroides*, gen. et sp. nov., a new zygopterid fern from the Upper Devonian (Frasnian) of Ellesmere, N.W.T., Arctic Canada.**

Hill, S.A., Scheckler, S.E., Basinger, J.F., *American journal of botany,* Jan. 1997, 84(1), p.85-103, 66 refs.

Paleoecology, Paleobotany, Stratigraphy, Subpolar regions, Fossils, Thin sections, Classifications, Plant tissues, Structural analysis, Microstructure, Canada—Northwest Territories—Ellesmere Island

51-2826

367 nm photochemistry of OClO thin films and OClO adsorbed on ice.

Graham, J.D., Roberts, J.T., Anderson, L.D., Grassian, V.H., *Journal of physical chemistry,* Dec. 12, 1996, 100(50), p.19,551-19,558, 40 refs.

Ice physics, Cloud physics, Stratosphere, Simulation, Aerosols, Photochemical reactions, Adsorption, Ozone, Ice vapor interface, Monomolecular films, Ice spectroscopy, Infrared spectroscopy, Degradation

51-2827

Precise measurement of dielectric anisotropy in ice Ih at 39 GHz.

Matsuoka, T., Fujita, S., Morishima, S., Mae, S., *Journal of applied physics,* Mar. 1, 1997, 81(5), p.2344-2348, 23 refs.

Ice physics, Ice dielectrics, Glacier ice, Ice optics, Anisotropy, Orientation, Microwaves, Resonance, Remote sensing, Simulation, Electric fields, Temperature effects

51-2828

Medium range oscillation characteristics of ozone at Zhongshan and Syowa stations during the antarctic ozone-hole period.

Lu, L.H., Zhou, X.J., Bian, L.G., Zhang, Z.Q., Zheng, X.D., *Antarctic Research (Chinese edition),* Sep. 1996, 8(3), p.20-28, In Chinese with English summary. 8 refs.

Ozone, Atmospheric composition, Air temperature, Atmospheric pressure, Oscillations, Antarctica—Zhongshan Station, Antarctica—Showa Station

Data on atmospheric ozone, surface temperature and pressure, collected at Zhongshan and Showa stations in July-Dec. 1993 and 1994, are presented. Quasi-one and -two week oscillations were observed; the latter was stronger than the former, for each atmospheric element, in 1993, but in 1994 only the quasi-one week oscillation occurred. In the Zhongshan-Showa region, the oscillations propagate from west to east at a speed, for the quasi-one week type, of about 17 longitudinal degree/day. In the Prydz Bay region, at middle-low stratosphere, the phase difference between the 2 types of oscillations for ozone, isobaric height and temperature is very small. (Auth. mod.)

51-2829

Characteristics of ultraviolet radiation in 1993-1994 at the Larsemann Hills, Antarctica.

Bian, L.G., Lu, L.H., Jia, P.Q., *Antarctic Research (Chinese edition),* Sep. 1996, 8(3), p.29-35, In Chinese with English summary. 8 refs.

Ozone, Ultraviolet radiation, Diurnal variations, Seasonal variations, Antarctica—Larsemann Hills

Characteristics of ultraviolet radiation (UV) and global radiation (Q), from Feb. 1993 to Dec. 1994, at the Larsemann Hills, are analyzed. Result show that most of UV and Q received at the horizontal surface occurred mainly in the warm season (Oct.-Feb.); the values were 87 and 86% of the annual total amounts, respectively. The strongest radiation flux appeared in polar days, when UV values were of the annual amount. The same ratios for the Naqu of the Qinghai, Qingzang Plateau and the Bergen of the arctic circle edge in midsummer were 52 and 47%. The ratio between UV and Q in springtime at the Larsemann Hills was greater than that in other seasons; this phenomenon did not occur at the arctic circle edge. The decrease of ozone in springtime at the Larsemann Hills not only enhances the UVB, but also has an effect on the UV and Q; their relations were basically met by the relationship of logarithmic line. (Auth. mod.)

51-2830

Evidence for changes in the North Atlantic deep water linked to meltwater surges during the Heinrich events.

Vidal, L., et al, *Earth and planetary science letters,* Jan. 1997, 146(1-2), p.13-27, 57 refs.

Oceanography, Pleistocene, Ocean currents, Icebergs, Ice melting, Ice rafting, Marine deposits, Drill core analysis, Convection, Lithology, Stratigraphy, Salinity, Isotope analysis, Statistical analysis, Atlantic Ocean

51-2831

Changes in sea surface hydrology associated with Heinrich event 4 in the North Atlantic Ocean between 40° and 60°N.

Cortijo, E., et al, *Earth and planetary science letters,* Jan. 1997, 146(1-2), p.29-45, 48 refs.

Oceanography, Pleistocene, Paleoclimatology, Paleoecology, Surface temperature, Salinity, Icebergs, Calving, Meltwater, Air ice water interaction, Drill core analysis, Isotope analysis, Correlation, Cooling, Atlantic Ocean

51-2832

Oxygen isotope composition of living *Neogloboquadrina pachyderma* (sin.) in the Arctic Ocean.

Bauch, D., Carstens, J., Wefer, G., *Earth and planetary science letters,* Jan. 1997, 146(1-2), p.47-58, 39 refs.

Oceanography, Paleoecology, Plankton, Oxygen isotopes, Isotope analysis, Suspended sediments, Drill core analysis, Salinity, Correlation, Arctic Ocean

51-2833

Deep sea and lake records of the southeast Asian paleomonsoons for the last 25 thousand years.

Huang, C.Y., et al, *Earth and planetary science letters,* Jan. 1997, 146(1-2), p.59-72, 49 refs.

Paleoclimatology, Surface temperature, Oceanography, Palynology, Paleoecology, Lacustrine deposits, Marine deposits, Radioactive age determination, Precipitation (meteorology), Drill core analysis, Periodic variations, China

51-2834

Record of the Blake Event during the last interglacial paleosol in the western Loess Plateau of China.

Fang, X.M., et al, *Earth and planetary science letters,* Jan. 1997, 146(1-2), p.73-82, 42 refs.

Magnetic anomalies, Geomagnetism, Pleistocene, Loess, Stratigraphy, Luminescence, Soil dating, Geochronology, Remanent magnetism, China—Loess Plateau

51-2835

Application of Bingham statistics to a paleopole data set: towards a better definition of APWP trends?

Cederquist, D.P., Niocaill, C.M., Van der Voo, R., *Earth and planetary science letters,* Jan. 1997, 146(1-2), p.97-106, 20 refs.

Continental drift, Geomagnetism, Pleistocene, Electric fields, Mapping, Orientation, Statistical analysis, Accuracy

51-2836

Comparison of recent ocean tide models using ground-based tidal gravity measurements.

Melchior, P., Francis, O., *Marine geodesy,* Oct.-Dec. 1996, 19(4), p.291-330, 34 refs.

Oceanography, Sea level, Tides, Gravity, Models, Statistical analysis, Antarctica—Amundsen-Scott Station, United States—Alaska—Alert, Antarctica—Showa Station, —Kerguelen Islands

The authors compare the periodic gravitational attraction and elastic loading effects calculated with different models to the corresponding effects measured at 289 ground-based tidal gravity stations distributed on all continents and several islands. This may be considered as a test of validity for the ocean tide models. It is shown that these ground-based data clearly detect serious imperfections such as the absence of the Arctic Ocean and of the Weddell and Ross Seas. Such comparisons have their limitations: noise level in tidal gravity observations, distance of the observing stations from the ocean basins, mass conservation, and resolution of the ocean tide models. No model is systematically best for all regions. New observations of gravity tides should be made in the proximity (50 km) of seas with strong tides but of simple coastal geometry (Gulf of Biscaye, Brazil). Severe contradictions remain in some specific areas such as Indonesia, New Zealand, and Patagonia, where the diurnal wave O_1 is of special interest. (Auth. mod.)

51-2837

Unusual "snow slurry" lahars from Ruapehu volcano, New Zealand, September 1995.

Cronin, S.J., Neall, V.E., Lecointre, J.A., Palmer, A.S., *Geology,* Dec. 1996, 24(12), p.1107-1110, 16 refs.

Volcanoes, Magma, Glacial hydrology, Glacier surfaces, Snow hydrology, Snowmelt, Snow erosion, Slush, Mass flow, Sediment transport, Geomorphology, Explosion effects, Lithology, Snow composition, New Zealand—Ruapehu, Mount

51-2838

Observations of supercooled raindrops in New Mexico summertime cumuli.

Blyth, A.M., Benestad, R.E., Krehbiel, P.R., Latham, J., *Journal of the atmospheric sciences,* Feb. 15, 1997, 54(4), p.569-575, 15 refs.

Precipitation (meteorology), Cloud droplets, Cloud physics, Supercooled clouds, Stratification, Temperature effects, Radar echoes, Polarization (waves), Snow pellets, Coalescence

51-2839

Civil engineering concerns of climate warming in the Arctic.

Ladanyi, B., *Royal Society of Canada. Transactions,* 1995, Series 6(vol.6), p.7-20, 20 refs.

Permafrost distribution, Permafrost transformation, Ground thawing, Construction, Frozen ground strength, Thaw weakening, Settlement (structural), Global warming, Environmental impact, Municipal engineering, Mathematical models, Forecasting, Design criteria

51-2840

Where did all the flowers go? The fate of temperate European flora during glacial periods.

Willis, K.J., *Endeavour,* Sep. 1996, 20(3), p.110-114, 23 refs.

Pleistocene, Paleoecology, Glaciation, Permafrost distribution, Ice sheets, Vegetation patterns, Distribution, Migration, Climatic changes, Cold weather survival, Palynology, Europe

51-2841

Russian market reforms to speed development of offshore resources.

Shcherbakov, V.P., *Offshore,* Oct. 1996, 56(10), p.92,94,96.

Offshore drilling, Petroleum industry, Economic development, Hydrocarbons, International cooperation, Natural resources, Exploration, Barents Sea

51-2842

Influence of glacitectonic fractures on wall failure in open excavations: Heath Steele Mines, New Brunswick, Canada.

Park, A.F., Broster, B.E., *Canadian geotechnical journal,* Oct. 1996, 33(5), p.720-731, With French summary. 17 refs.

Mining, Excavation, Trenching, Glacial geology, Tectonics, Bedrock, Walls, Joints (junctions), Cracking (fracturing), Rock mechanics, Rock properties, Permeability, Forecasting, Canada—New Brunswick

51-2843

On the relationship between Eurasian snow cover and the Asian summer monsoon.

Sankar-Rao, M., Lau, K.M., Yang, S., *International journal of climatology,* June 1996, 16(6), p.605-616, 33 refs.

Climatology, Precipitation (meteorology), Rain, Snow cover distribution, Weather observations, Atmospheric circulation, Snow cover effect, Snow air interface, Correlation, Seasonal variations, Statistical analysis, Temperature effects

51-2844

Modified air conditioner preserves Ampato Maiden. *ASHRAE journal,* July 1996, 38(7), p.8.

Air conditioning, Biomass, Preserving, Cold storage, Temperature control, Frost protection, Defrosting, Computer applications

51-2845

Comparative leaf morphology spectra of plant communities in New Zealand, the Andes and the European Alps.

Halloy, S.R.P., Mark, A.F., *Royal Society of New Zealand. Journal,* Mar. 1996, 26(1), p.41-78, Refs. p.74-78.

Plant ecology, Alpine landscapes, Plant tissues, Structural analysis, Spectra, Biogeography, Vegetation patterns, Environmental impact, Classifications, Climatic factors, Statistical analysis, New Zealand, Colombia, Chile, Austria

51-2846

Hybrid histogram/neural network classifier for creating global cloud masks.

Logar, A., Corwin, E., Alexander, J., Lloyd, D., Berendes, T., Welch, R., *International journal of remote sensing,* Mar. 10, 1997, 18(4), p.847-869, 26 refs.

Cloud cover, Spaceborne photography, Radiometry, Classifications, Remote sensing, Detection, Statistical analysis, Image processing, Spectra, Sea ice, Slush, Ice cover effect, Snow cover effect, Accuracy

51-2847

Hopfield neural network as a tool for feature tracking and recognition from satellite sensor images.

Côté, S., Tatnall, A.R.L., *International journal of remote sensing,* Mar. 10, 1997, 18(4), p.871-885, 25 refs.

Remote sensing, Spaceborne photography, Sensor mapping, Image processing, Oceanography, Surface properties, Cloud cover, Floating ice, Drift, Ice detection, Classifications, Statistical analysis

51-2848

Estimating surface radiation fluxes in the Arctic from TOVS brightness temperatures.

Schweiger, A.J., Key, J.R., *International journal of remote sensing,* Mar. 10, 1997, 18(4), p.955-970, 28 refs.

Climatology, Radiation balance, Polar atmospheres, Brightness, Radiance, Sounding, Sensor mapping, Classifications, Radiometry, Statistical analysis, Air ice water interaction, Drift stations, Correlation, Arctic Ocean

51-2849

Characteristics of atmospheric boundary layer structure and transfer of the turbulent fluxes over the Zhongshan Station area, Antarctica.

Qu, S.H., Gao, D.Y., *Antarctic Research (Chinese edition),* Dec. 1996, 8(4), p.1-10, In Chinese with English summary. 14 refs.

Meteorological data, Turbulent flow, Turbulent boundary layer, Ice air interface, Snow air interface, Antarctica—Zhongshan Station

Characteristics of the atmospheric boundary layer structure, and the transfer of turbulent fluxes over the Zhongshan Station area, are discussed. Data on temperature, humidity, wind and pressure were collected by using the TMT (tethersonde meteorological tower) sounding system in the summer of 1994-1995. The fluxes of momentum and sensible heat were evaluated, by semiempirical flux-profile relation of Monin-Obukhov similarity theory, from the observed data. Results show that the characteristics of atmospheric boundary layer structure and the transfer of turbulent fluxes have obvious differences at different stations. (Auth. mod.)

51-2850

Ice-geomorphologic information extract from satellite image on antarctic area around Larsemann Hills.

Sun, J.B., Liu, J.L., Guo, X.G., *Antarctic Research (Chinese edition),* Dec. 1996, 8(4), p.20-30, In Chinese with English summary. 7 refs.

LANDSAT, Image processing, Mapping, Spaceborne photography, Ice surface, Meteorological factors, Antarctica—Larsemann Hills

This paper discusses extracts of elevation and ice-geomorphologic information from the spectral and spatial features in the Landsat-TM image of Antarctica, with ARIES digital image processing system, raster-vector data transformation and creation of topologic relation between objects. Edited by RAMS processing system, the ice-geomorphologic map is plotted. At last, forming, distribution, change of ice-geomorphology and influence of the change on the environment are analyzed. (Auth.)

51-2851

Survey of ice avalanche in the area of Zhongshan Station, Antarctica.

Yang, Y.H., Wang, W.D., *Antarctic Research (Chinese edition),* Dec. 1996, 8(4), p.72-75, In Chinese with English summary.

Calving, Seismic surveys, Meteorological factors, Wind factors, Ice surveys, Antarctica—Zhongshan Station

Using digital-trigger seismography, measurements were carried out at Zhongshan Station to determine the relationship between glacier calving regularity and weather factors, such as temperature and wind speed. It is suggested that the data obtained could also be used in iceberg and ice sheet research. Results show that the calving frequency change curve has a parabolic shape from Jan. to Sep. From Oct. to Dec., the frequency increases rapidly; as the temperature rises, the calving frequency also increases. It is also found that frequency and wind speed are inversely related.

51-2852

Unearthing Earth's ancient atmosphere beneath two miles of Greenland ice.

McDonald, K.A., *Chronicle of higher education,* Aug. 2, 1996, p.A6,A11.

Paleoclimatology, Climatic changes, Glaciology, Ice sheets, Sampling, Ice cores, Drill core analysis, Isotope analysis, Correlation, Air temperature, Temperature variations, Greenland

51-2853

Preserving a priceless library of ice.

McDonald, K.A., *Chronicle of higher education,* Aug. 2, 1996, p.A7,A11.

Glaciology, Ice cores, Preserving, Ice sampling, Classifications, Storage, Data processing

The National Ice Core Laboratory, built in 1993 by the National Science Foundation, the U.S. Geological Survey, and the University of Colorado at Boulder, maintains a repository of 13,000 ice cores collected from Greenland and Antarctica. The air temperature in the main ice storage area is kept at a constant -36°C. If the laboratory's main power fails, a generator is automatically turned on. If the compressor that cools the facility breaks, the replacement goes into service. If both the main power and the generator go out, a compressor that operates on natural gas switches on. If all else fails, thick insulation can keep the interior of the building at the proper temperature for 24 hours. Information on the ice cores is accessible on the World Wide Web at http://instaar.colorado. edu/nicl/welcome.html.

51-2854

Shelf of Barents and Kara Seas—new large resource base of Russia (structure and main exploration directions).

Borisov, A.V., Vinnikovskiĭ, V.S, Tanigil, I.A., *Petroleum geology,* Sep.-Oct. 1995, 29(9-10), p.301-308, Translated from Geologiia nefti i gaza.

Marine geology, Geologic structures, Bottom sediment, Reservoirs, Hydrocarbons, Natural gas, Exploration, Sedimentation, Seismic surveys, Economic development, Barents Sea

51-2855

Holocene environmental change in a marine-estuarine-lacustrine sediment sequence, King George Island, South Shetland Islands.

Martinez-Macchiavello, J.C., Tatur, A., Servant-Vildary, S.S., Del Valle, R., *Antarctic science,* Dec. 1996, 18(4), p.313-322, 55 refs.

Quaternary deposits, Lacustrine deposits, Marine deposits, Deltas, Estuaries, Meltwater, Shoreline modification, Paleoecology, Sedimentation, Plankton, Sampling, Drill core analysis, Classifications, Radioactive age determination, Antarctica—South Shetland Islands

51-2856

Antarctic krill under perennial sea ice in the western Weddell Sea.

Mel'nikov, I.A., Spiridonov, V.A., *Antarctic science,* Dec. 1996, 18(4), p.323-329, 47 refs.

Marine biology, Algae, Biomass, Aggregates, Dispersions, Suspended sediments, Ice water interface, Ice cover effect, Ecosystems, Sampling, Advection, Antarctica—Weddell Sea

51-2857

Relationships between surface sediment diatom assemblages and water chemistry gradients in saline lakes of the Vestfold Hills, Antarctica.

Roberts, D., McMinn, A., *Antarctic science,* Dec. 1996, 18(4), p.331-341, Refs. p.338-340.

Limnology, Salt lakes, Ecosystems, Algae, Water chemistry, Salinity, Suspended sediments, Sampling, Statistical analysis, Classifications, Antarctica—Vestfold Hills

51-2858

Mesozooplankton biomass distribution in the upper 100 m layer of the Atlantic sector of the southern ocean.

Rudiakov, IU.A., *Antarctic science,* Dec. 1996, 18(4), p.343-348, 35 refs.

Marine biology, Biomass, Plankton, Ecology, Distribution, Sampling, Mapping, Biogeography, Statistical analysis, Seasonal variations, Atlantic Ocean

51-2859

Assessment of the role of the marginal ice zone in the carbon cycle of the southern ocean.

Savidge, G., et al, *Antarctic science,* Dec. 1996, 18(4), p.349-358, 55 refs.

Marine biology, Oceanography, Sea ice distribution, Ice edge, Ice melting, Ice cover effect, Plankton, Biomass, Chlorophylls, Geochemical cycles, Ice water interface, Models, Antarctica—Weddell Sea

51-2860

Freshwater diatom communities of the Strømness Bay area, South Georgia.

Van de Vijver, B., Beyens, L., *Antarctic science,* Dec. 1996, 8(4), p.359-368, 24 refs.

Limnology, Streams, Plankton, Biomass, Ecosystems, Sampling, Classifications, Statistical analysis, —South Georgia

51-2861

Medium-scale heat fluxes across the Antarctic Circumpolar Current in the Drake Passage and western Scotia Sea.

Piola, A.R., Grasselli, M.B., *Antarctic science,* Dec. 1996, 8(4), p.369-378, 35 refs.

Oceanography, Ocean currents, Heat flux, Heat loss, Turbulent diffusion, Thermal diffusion, Temperature gradients, Water temperature, Profiles, Temperature measurement, —Scotia Sea, —Drake Passage

51-2862

Onset of biological winter in the eastern Weddell gyre (Antarctica) planktonic community.

Spiridonov, V.A., Nöthig, E.M., Schröder, M., Wisotzki, A., *Journal of marine systems,* Dec. 1996, 9(3-4), p.211-230, Refs. p.227-230.

Marine biology, Biomass, Sampling, Plankton, Seasonal variations, Classifications, Ecosystems, Chlorophylls, Nutrient cycle, Hydrography, Antarctica—Weddell Sea

Data on hydrography, phyto- and zooplankton, obtained on a transect along the 0° meridian during the Winter Weddell Gyre Study, June 1992, revealed peculiarities of the early winter situation in the eastern Weddell Gyre. The vertical distribution and developmental stage composition of *Rhincalanus gigas, Calanoides acutus, Calanus propinquus* and krill, *Euphausia superba* larvae, were a good index for a general assessment of the seasonal condition of the plankton communities. There were five zones differing in seasonal situation: (1) the Polar Front and the southern ACC (not studied in detail), (2) the Weddell Front, (3) the Weddell Gyre interior, (4) the Maud Rise area, and (5) the Coastal Current zone. In the eastern part of the Weddell Front (compared to the western part) seasonal development of both phytoplankton and herbivorous zooplankton is delayed in spring but prolonged in late autumn. Furthermore, it appears that the Weddell Sea ecosystem exhibits a much higher degree of spatial and temporal variability than thought before. This may have an impact on seasonal patterns of organic carbon transport from the pelagic realm to deeper water layers and to the sediment. (Auth. mod.)

51-2863

Distribution patterns of the mesozooplankton, principally siphonophores and medusae, in the vicinity of the Antarctic Slope Front (eastern Weddell Sea).

Pagès, F., Schnack-Schiel, S.B., *Journal of marine systems,* Dec. 1996, 9(3-4), p.231-248, 19 refs.

Marine biology, Biomass, Ecosystems, Distribution, Plankton, Sampling, Hydrography, Temperature effects, Antarctica—Weddell Sea

The composition, abundance and vertical distribution of mesozooplankton, particularly siphonophores and medusae (27 species), collected along two transects in the eastern Weddell Sea have been analyzed. Both transects were characterized by a steep thermocline that on approaching the coastline defined the Antarctic Slope Front. The front acted as a strong boundary in the shelf-slope and caused a pronounced cross frontal gradient in the populations of cnidarians. Few species and low abundances were found in the upper cold waters and most of the populations concentrated in and below the thermocline. The analysis of the gastrozooids of the physonect siphonophore *Pyrostephos vanhoeffeni* showed a wide variety of prey but the relatively high contribution of krill larvae reveals a substantial trophic impact when both organisms co-occur. (Auth.)

51-2864

Late Quaternary temporal and event classifications, Great Lakes region, North America.

Johnson, W.H., et al, *Quaternary research,* Jan. 1997, 47(1), p.1-12, Refs. p.10-12.

Pleistocene, Quaternary deposits, Classifications, Terminology, Glacier oscillation, Glacial deposits, Glacial geology, Stratigraphy, Age determination, Great Lakes

51-2865

Younger Dryas icecap in the equatorial Andes.

Clapperton, C.M., et al, *Quaternary research,* Jan. 1997, 47(1), p.13-28, Refs. p.27-28.

Pleistocene, Mountain glaciers, Quaternary deposits, Glacier oscillation, Moraines, Magma, Ice edge, Stratigraphy, Paleoecology, Geomorphology, Radioactive age determination, Ecuador—Andes

51-2866

Atmospheric circulation and variations in Scandinavian glacier mass balance.

Pohjola, V.A., Rogers, J.C., *Quaternary research,* Jan. 1997, 47(1), p.29-36, 31 refs.

Mountain glaciers, Glacier surveys, Glacier mass balance, Atmospheric circulation, Ice air interface, Glacier oscillation, Air temperature, Climatic factors, Atmospheric pressure, Seasonal variations, Correlation, Statistical analysis, Sweden, Russia, Norway

51-2867

Calibration, review, and geomorphic implications of postglacial radiocarbon ages in southeastern Alberta, Canada.

Campbell, C., Campbell, I.A., *Quaternary research,* Jan. 1997, 47(1), p.37-44, Refs. p.42-44.

Glacial geology, Glacier oscillation, Pleistocene, Glacial deposits, Quaternary deposits, Geomorphology, Radioactive age determination, Insolation, Paleoclimatology, Canada—Alberta

51-2868

Paleomagnetic investigation of Lake Lahontan sediments and its application for dating pluvial events in the northwestern Great Basin.

Liddicoat, J.C., Coe, R.S., *Quaternary research,* Jan. 1997, 47(1), p.45-53, 33 refs.

Pleistocene, Quaternary deposits, Lacustrine deposits, Geomagnetism, Orientation, Geochronology, Stratigraphy, Statistical analysis, United States—Nevada—Truckee River

51-2869

Origin and evolution of lunettes on the High Plains of Texas and New Mexico.

Holliday, V.T., *Quaternary research,* Jan. 1997, 47(1), p.54-69, Refs. p.67-69.

Geomorphology, Pleistocene, Landforms, Landscape development, Quaternary deposits, Eolian soils, Soil profiles, Stratigraphy, Isotope analysis, Radioactive age determination, Wind erosion, United States—Texas, United States—New Mexico

51-2870

Holocene paleohydrology of the tropical Andes from lake records.

Abbott, M.B., Seltzer, G.O., Kelts, K.R., Southon, J., *Quaternary research,* Jan. 1997, 47(1), p.70-80, 33 refs.

Pleistocene, Paleoclimatology, Lacustrine deposits, Quaternary deposits, Hydrologic cycle, Water level, Cirque glaciers, Glacier melting, Sedimentation, Insolation, Radioactive age determination, Bolivia—Andes

51-2871

High-resolution 11,400-yr diatom record from Lake Victoria, East Africa.

Stager, J.C., Cumming, B., Meeker, L., *Quaternary research,* Jan. 1997, 47(1), p.81-89, 55 refs.

Paleoecology, Plankton, Paleoclimatology, Climatic changes, Periodic variations, Lacustrine deposits, Quaternary deposits, Sampling, Classifications, Statistical analysis, Radioactive age determination

51-2872

Holocene climate effects on the development of a peatland on the Tuktoyaktuk Peninsula, Northwest Territories.

Vardy, S.R., Warner, B.G., Aravena, R., *Quaternary research,* Jan. 1997, 47(1), p.90-104, 59 refs.

Paleoclimatology, Climatic changes, Continuous permafrost, Arctic landscapes, Peat, Wetlands, Permafrost hydrology, Landscape development, Ice composition, Stratigraphy, Paleoecology, Radioactive age determination, Drill core analysis, Canada—Northwest Territories—Tuktoyaktuk Peninsula

51-2873

Radial profile of mantle viscosity: results from the joint inversion of convection and postglacial rebound observables.

Mitrovica, J.X., Forte, A.M., *Journal of geophysical research,* Feb. 10, 1997, 102(B2), p.2751-2769, Refs. p.2766-2769.

Geophysical surveys, Isostasy, Pleistocene, Sea level, Ice sheets, Ice loads, Tectonics, Profiles, Gravity anomalies, Viscoelasticity, Periodic variations, Fluid dynamics, Convection

51-2874

Comparison of geoid undulations for west central Greenland.

Roman, D.R., et al, *Journal of geophysical research,* Feb. 10, 1997, 102(B2), p.2807-2814, 18 refs.

Subpolar regions, Geophysical surveys, Gravity anomalies, Aerial surveys, Height finding, Lidar, Lasers, Ice sheets, Ice surface, Correlation, Topographic surveys, Models, Greenland

51-2875

***In situ* biological weighting function for UV inhibition of phytoplankton carbon fixation in the Southern Ocean.**

Boucher, N.P., Prézelin, B.B., *Marine ecology progress series,* Dec. 5, 1996, 144(1-3), p.223-236, Refs. p.234-236.

Ozone, Ultraviolet radiation, Biomass, Algae, Photosynthesis, Antarctica—Palmer Station

A daily integrated *in situ* biological weighting function (BWF) for inhibition of primary production by ultraviolet radiation (UVR, 280-400 nm) was determined for a natural community of antarctic diatoms maintained under daylight conditions. In the early austral spring of 1993 near Palmer Station surface samples were maintained in 6 spectrally distinct outdoor incubators over the course of a single day and the spectral sensitivity of photosynthetic carbon fixation rates and phytoplankton pigmentation was quantified. The changes in spectral sensitivity to ozone-dependent UV-B (280-320 nm radiation) and ozone-independent UV-A (320-400 nm radiation) was resolved on time scale of 2 h intervals over the course of the 10 h incubation. The UV-B portion of the solar spectrum photoinhibited daily rates of primary production by 15%, while UV-A was responsible for a 19% reduction in daily averaged rates of carbon fixation. (Auth. mod.)

51-2876

Influence of ocean heat transport on the climate of the Last Glacial Maximum.

Webb, R.S., Rind, D.H., Lehman, S.J., Healy, R.J., Sigman, D., *Nature,* Feb. 20, 1997, 385(6618), p.695-699, 45 refs.

Climatic changes, Heat transfer, Air temperature, Ocean environments, Models

A series of climate simulations using an atmospheric general circulation model shows that maintaining ocean heat transport at close to present-day values, but with otherwise glacial boundary conditions, leads to an enhanced cooling, particularly in the tropics. This is in agreement with recent geochemical evidence from fossil corals, ground waters, and ice. Near-modern ocean heat transport may have been sustained in all ocean basins during the Last Glacial Maximum in order to balance the formation and export of Glacial North Atlantic Intermediate Water. Graphs which show the pole to pole ocean heat transport are included and discussed in the text. (Auth. mod.)

51-2877

Interhemispheric synchrony of the last deglaciation inferred from alkenone palaeothermometry.

Bard, E., Rostek, F., Sonzogni, C., *Nature,* Feb. 20, 1997, 385(6618), p.707-710, 39 refs.

Water temperature, Climatic changes, Ice cores, Air temperature, Glaciers, Antarctica—Byrd Station, Antarctica—Vostok Station

In this paper the alkenone method of sea surface temperature reconstruction is applied to several high-resolution sediment cores recovered from the tropical Indian Ocean between 20°N and 20°S. The inferred initial sea surface temperature warming ca. 15,000 years ago at 20°S is in phase with Northern Hemisphere sea (this study) and air temperature changes, but lags antarctic warming by several millennia. This finding, along with the results of recent modelling studies, provides strong support for the idea that changes in the ocean's global thermohaline circulation were not the only cause of interhemispheric climate teleconnection during the last deglaciation. (Auth. mod.)

51-2878

Internal waves and tides in the western Weddell Sea: observations from Ice Station Weddell.

Levine, M.D., Padman, L., Muench, R.D., Morison, J.H., *Journal of geophysical research,* Jan. 15, 1997, 102(C1), p.1073-1089, 59 refs.

Ocean currents, Water temperature, Tides, Measuring instruments, Ocean waves, Pack ice, Antarctica—Weddell Sea

The upper ocean current and temperature fields in the western Weddell Sea were measured from the drifting pack ice at Ice Station Weddell 1 (ISW) and nearby sites. These data document the structure and variability of the internal gravity wave field and tidal currents in this remote region. At ISW, coherence between vertically separated sensors was used to estimate vertical wave number bandwidth. Energy and bandwidth estimates are compared with previous studies in both ice-covered and temperate oceans. Using the measurements of the internal wave field and existing parameterizations of mixing, the authors estimate the vertical heat flux from the Warm Deep Water toward the surface. Tidal currents contributed significantly to the total measured horizontal velocity variance. The tides were primarily barotropic and increased toward the west in both the semidiurnal and diurnal frequency bands. It is suggested that the stronger tidal currents to the west over the shallower water of the upper continental slope, are indirectly responsible for the higher internal wave energy at site C relative to ISW. (Auth. mod.)

51-2879

Winter snow cover on sea ice in the Weddell Sea.

Massom, R.A., Drinkwater, M.R., Haas, C., *Journal of geophysical research,* Jan. 15, 1997, 102(C1), p.1101-1117, 71 refs.

Snow cover, Snow depth, Snow density, Snow temperature, Sea ice, Snow ice interface, Antarctica—Weddell Sea

Measurements of snow thickness, temperature, salinity, density, and stratigraphy acquired during the 1992 Winter Weddell Gyre Study are presented. Results indicate that the winter snow cover on sea ice in the Weddell Sea is extremely variable. Extreme fluctuations in antarctic synoptic conditions occur during the austral winter. They result in unique modifications and additions to the snow layer during the aging process and act to stabilize an otherwise easily wind-redistributed shallow snow cover and develop well-packed drift features. The latter occur even over relatively undeformed areas of sea ice and have a significant localized effect on the snow thickness distribution. Significant variability in snow grain size and density is observed as a result of cyclical switches between high- and low-temperature gradient metamorphism. Multiple icy layers indicate multiple thaw-freeze events. One such event occurred during a 3-day station, during which the air temperature rose by 22°C in 12 hours. Also examined are mechanisms for flooding of the snow-ice interface, including snow loading. Even where the latter is not a factor, the layer of snow immediately above the snow-ice interface is commonly damp and saline (>10 per mill). Limitations in the data set are discussed, and comparisons are drawn with other experiments. (Auth. mod.)

51-2880

Surface roughness of Baltic sea ice.

Manninen, A.T., *Journal of geophysical research,* Jan. 15, 1997, 102(C1), p.1119-1139, 23 refs.

Sea ice, Measuring instruments, Surface roughness, Snow depth, Pressure ridges, Ice surface, Bothnia, Bay, Finland, Gulf

51-2881

Determination of the depth dependent scattering coefficient in sea ice.

Haines, E.M., Buckley, R.G., Trodahl, H.J., *Journal of geophysical research,* Jan. 15, 1997, 102(C1), p.1141-1151, 23 refs.

Sea ice, Light scattering, Ice optics, Antarctica—McMurdo Sound

Measurements of the spatial spreading of light in typical first-year sea ice in McMurdo Sound have been characterized in terms of depth dependent scattering using Monte Carlo simulations. The results are shown to place constraints on models of the optical transmission of sea ice and on the relationship of the optical scattering parameters to the physical structure of the ice. Comparisons for different sites and seasons within a given year and between years are presented. The backscattering spatial profiles are shown to fix the scattering parameters of the strongly scattering top layer and the horizontal component of the anisotropic scattering parameter in the bulk layer. The transmission spatial profiles determine the anisotropy of the bulk layer and the absorption by algae near the base of the ice. It is demonstrated that the top layer is very sensitive to warming of the ice and that the scattering properties of this layer largely determine the albedo of sea ice while the transmission is affected by the nature of the top layer, the scattering in the bulk layer, and the absorption in the algal layer. A quantitative relationship between the scattering length and the air volume fraction is demonstrated. (Auth.)

51-2882

Volcanic glass found in Late Quaternary Chinese loess: a pointer for future studies?

Eden, D.N., Frogatt, P.C., Zheng, H.H., Machida, H., *Quaternary international,* July-Sep.-Nov. 1996, Vol.34-36, International Inter-INQUA Field Conference and Workshop on Tephrochronology, Loess, and Paleopedology, Hamilton, New Zealand, Feb. 7-12, 1994. Proceedings, p.107-111, 15 refs.

Quaternary deposits, Loess, Pleistocene, Volcanic ash, Geochronology, Stratigraphy, Chemical analysis, Grain size, China—Shandong Peninsula

51-2883

Comprehensive pollen- and tephra-based chronostratigraphic model for the Late Glacial and Holocene period in the French Massif Central.

Juvigné, E., et al, *Quaternary international,* July-Sep.-Nov. 1996, Vol.34-36, International Inter-INQUA Field Conference and Workshop on Tephrochronology, Loess, and Paleopedology, Hamilton, New Zealand, Feb. 7-12, 1994. Proceedings, p.113-120, 38 refs.

Pleistocene, Mountain soils, Volcanic ash, Quaternary deposits, Palynology, Stratigraphy, Geochronology, Sampling, Radioactive age determination, Carbon isotopes, Models, Accuracy, France—Massif Central

51-2884

Tephrochronology and paleoclimatology of the Last Interglacial-Glacial cycle recorded in Alaskan loess deposits.

Begét, J.E., *Quaternary international,* July-Sep.-Nov. 1996, Vol.34-36, International Inter-INQUA Field Conference and Workshop on Tephrochronology, Loess, and Paleopedology, Hamilton, New Zealand, Feb. 7-12, 1994. Proceedings, p.121-126, 39 refs.

Paleoclimatology, Pleistocene, Quaternary deposits, Climatic changes, Loess, Volcanic ash, Permafrost indicators, Glacial deposits, Eolian soils, Radioactive age determination, Correlation, United States—Alaska—Tanana River, United States—Alaska—Yukon River

51-2885

Late Quaternary tephra-derived paleosols in central Italy's carbonate Apennine Range: stratigraphical and paleoclimatological implications.

Frezzotti, M., Narcisi, B., *Quaternary international,* July-Sep.-Nov. 1996, Vol.34-36, International Inter-INQUA Field Conference and Workshop on Tephrochronology, Loess, and Paleopedology, Hamilton, New Zealand, Feb. 7-12, 1994. Proceedings, p.147-153, 37 refs.

Paleoclimatology, Quaternary deposits, Volcanic ash, Stratigraphy, Mountain soils, Soil dating, Geochronology, Soil formation, Geochemistry, Italy—Apennines

51-2886

Loess, soil stratigraphy and Aokautere Ash on Late Pleistocene surfaces in South Westland, New Zealand: interpretation and correlation with the glacial stratigraphy.

Almond, P.C., *Quaternary international,* July-Sep.-Nov. 1996, Vol.34-36, International Inter-INQUA Field Conference and Workshop on Tephrochronology, Loess, and Paleopedology, Hamilton, New Zealand, Feb. 7-12, 1994. Proceedings, p.163-176, 33 refs.

Glacial geology, Pleistocene, Glacial deposits, Loess, Volcanic ash, Stratigraphy, Quaternary deposits, Sedimentation, Particle size distribution, Geochronology, Correlation, New Zealand—Westland

51-2887

Thermoluminescence ages of post-glacial loess, Rakaia River, South Island, New Zealand.

Berger, G.W., Tonkin, P.J., Pillans, B.J., *Quaternary international,* July-Sep.-Nov. 1996, Vol.34-36, International Inter-INQUA Field Conference and Workshop on Tephrochronology, Loess, and Paleopedology, Hamilton, New Zealand, Feb. 7-12, 1994. Proceedings, p.177-181, 19 refs.

Pleistocene, Quaternary deposits, Loess, Gravel, Sedimentation, Geochronology, Luminescence, Soil dating, Stratigraphy, New Zealand—South Island

51-2888

Recent work on Quaternary paleosols in Britain.

Catt, J.A., *Quaternary international,* July-Sep.-Nov. 1996, Vol.34-36, International Inter-INQUA Field Conference and Workshop on Tephrochronology, Loess, and Paleopedology, Hamilton, New Zealand, Feb. 7-12, 1994. Proceedings, p.183-190, 63 refs.

Pleistocene, Loess, Soil surveys, Quaternary deposits, Subsurface investigations, Periglacial processes, Soil classification, Soil dating, Correlation, United Kingdom

51-2889

Developments in the analysis of volcanic glass shards by laser ablation ICP-MS: quantitative and single internal standard-multi-element methods.

Pearce, N.J.G., Westgate, J.A., Perkins, W.T., *Quaternary international,* July-Sep.-Nov. 1996, Vol.34-36, International Inter-INQUA Field Conference and Workshop on Tephrochronology, Loess, and Paleopedology, Hamilton, New Zealand, Feb. 7-12, 1994. Proceedings, p.213-227, 23 refs.

Volcanic ash, Chemical analysis, Lasers, Laboratory techniques, Ablation, Microelement content, Spectroscopy, Standards, Quaternary deposits, Isotope analysis, Statistical analysis, United States—Alaska—Wrangell, Mount

51-2890

Inter-laboratory comparison of the electron probe microanalysis of glass geochemistry.

Hunt, J.B., Hill, P.G., *Quaternary international,* July-Sep.-Nov. 1996, Vol.34-36, International Inter-INQUA Field Conference and Workshop on Tephrochronology, Loess, and Paleopedology, Hamilton, New Zealand, Feb. 7-12, 1994. Proceedings, p.229-241, 26 refs.

Quaternary deposits, Pleistocene, Stratigraphy, Volcanic ash, Sampling, Spectroscopy, Laboratory techniques, Geochemistry, Standards, Accuracy, Correlation, Statistical analysis

51-2891

Conceptual model for the enhancement of magnetic susceptibility in soils.

Singer, M.J., Verosub, K.L., Fine, P., TenPas, J., *Quaternary international,* July-Sep.-Nov. 1996, Vol.34-36, International Inter-INQUA Field Conference and Workshop on Tephrochronology, Loess, and Paleopedology, Hamilton, New Zealand, Feb. 7-12, 1994. Proceedings, p.243-248, 26 refs.

Pleistocene, Loess, Geomagnetism, Sampling, Soil analysis, Magnetic properties, Profiles, Lithology, Diagenesis, Laboratory techniques, Paleoclimatology, Climatic changes, Models

51-2892

Micromorphological study of pedogenic processes in an evolutionary soil sequence, formed on Late Quaternary rhyolitic tephra deposits, North Island, New Zealand.

Bakker, L., Lowe, D.J., Jongmans, A.G., *Quaternary international,* July-Sep.-Nov. 1996, Vol.34-36, International Inter-INQUA Field Conference and Workshop on Tephrochronology, Loess, and Paleopedology, Hamilton, New Zealand, Feb. 7-12, 1994. Proceedings, p.249-261, 53 refs.

Quaternary deposits, Pleistocene, Volcanic ash, Soil formation, Soil analysis, Radioactive age determination, Correlation, Microanalysis, Microstructure, Mineralogy, Statistical analysis, New Zealand—North Island

51-2893

Characteristics of the NOAA/NESDIS cloud retrieval algorithm using HIRS-MSU radiance measurements.

Yang, S.K., Zhou, S.S., McMillin, L.M., Campana, K.A., *Journal of applied meteorology,* Nov. 1996, 35(11), p.1980-1990, 12 refs.

Clouds (meteorology), Radiation measuring instruments, Infrared radiation

This cloud retrieval algorithm described in McMillin et al., uses multiple channel pairs with a two-pass procedure for enhancing accuracies. The current paper complements McMillin et al. in several ways. First, it describes the characteristics of the channel pairs used in the algorithm while documenting the logic of the channel selection. It shows that the cloud-top heights and cloud fractions are dependent on the sensing channel pairs. The higher the altitude of the weighting function, the smaller the cloud fractions. Second, it adds an atmospheric attenuation correction and displays its effect on cloud-top heights. Without the attenuation correction, the cloud-top distributions are separated into two bands, possibly as a result of the distance between the heights of the weighting functions of the sensing channel pair. The attenuation correction effectively eliminates the gap, both by lowering the upper band and by elevating the lower band. The cloud fractions from this experimental operation are compared with Air Force Real-Time Nephanalysis for 3 months, and they reveal its strength in detecting low-level stratus. The range of data retrieval extends from approximately 80°S through 80°N. (Auth. mod.)

51-2894

Concreting and bricklaying in cold weather.

Newman, A.J., Department of Scientific and Industrial Research. Building Research Station. National building studies. Bulletin, No.3, London, Her Majesty's Stationary Office, 1964, 18p., First published in 1948, reprinted with minor amendments in 1964.

Winter concreting, Frost protection, Bricks, Mortars, Cold weather construction

51-2895

Surveys of winter working practices in Scotland.

Wilson, P.H., *Building Research Station, Garston, Watford, Hertfordshire, England. Building research current papers. Construction series,* 1965, No.20, 5p. + tables and figs., 8 refs.

Winter concreting, Cold weather construction, Labor factors, United Kingdom—Scotland

51-2896

Comparisons of cross sections for melting hydrometeors as derived from dielectric mixing formulas and a numerical method.

Meneghini, R., Liao, L., *Journal of applied meteorology,* Oct. 1996, 35(10), p.1658-1670, 33 refs.

Ice dielectrics, Ice melting, Water content, Snow melting

51-2897

Radioactivity measurements applied to glaciers and lake sediments.

Pinglot, J.F., Pourchet, M., *Science of the total environment,* Dec. 1, 1995, Vols. 173/174, Special issue: Environmental Radiochemical Analysis. A collection of Papers Presented at the Seventh Symposium on Environmental Radiochemical Analysis. Edited by G.W.A. Newton, p.211-223, 45 refs.

Radioactivity, Glaciers, Lakes, Sediments, Lacustrine deposits, Fallout, Radioactive age determination, Glacier ice, Ice dating, Soil dating, Antarctica—Vostok Station, Antarctica—James Ross Island, Antarctica—Charlie, Dome, Antarctica—Amundsen-Scott Station

The behavior of glaciers, polar ice-caps and lakes can be studied by means of natural and artificial radioactivity measurements conducted on snow (Alps, Arctic and Antarctic) and sediments samples. The nuclear decay of elements (^{210}Pb and ^{238}U filiation products) and nuclear events (atmospheric thermonuclear tests: 1954 and 1962-63; Chernobyl accident: 1986) allow an absolute dating of corresponding layers. These determinations need radiochemical separations (electro-plating, ion exchange filters), followed by ultra low level alpha and gamma spectrometrics, or beta counting (^{137}Cs, ^{90}Sr). The high purity—N type—germanium detector (Compton-suppressed) allows the ^{210}Pb analysis at 46.52 keV, enabling a direct comparison with ^{210}Po alpha spectrometry. Typical applications concern primarily dating, and the determination of mean annual accumulation rates of glaciers, sedimentation rate and mixing time in lakes, with their associated spatio-temporal variations. These measurements give access to the global fallouts of radionuclides and to meteorological parameters: air to snow (or sediment) transfer, deposition processes and atmospheric circulation. (Auth.)

51-2898

Vegetation-induced warming of high-latitude regions during the Late Cretaceous period.

Otto-Bliesner, B.L., Upchurch, G.R., *Nature,* Feb. 27, 1997, 385(6619), p.804-807, 35 refs.

Global warming, Vegetation factors, Polar regions, Models, Climatic changes

A global climate model for the latest Cretaceous (66 mya) is used to examine the role played by high- and mid-latitude forests in surface temperature regulation. In simulations, this forest vegetation warms the global climate by 2.2°C. The low-albedo deciduous forests cause high-latitude land areas to warm, which then transfer more heat to adjacent oceans, thus delaying sea-ice formation and increasing winter temperatures over coastal land. Overall, the inclusion of some of the physical and physiological climate feedback effects of high-latitude forest vegetation in these simulations reduces the existing discrepancies between observed and modelled climates of the latest Cretaceous, suggesting that these forests may have made an important contribution to climate regulation during periods of global warmth.

51-2899

Interannual variation of global atmospheric angular momentum.

Chen, T.C., Tribbia, J.J., Yen, M.C., *Journal of the atmospheric sciences,* Oct. 1, 1996, 53(19), p.2852-2857, 11 refs.

Atmospheric circulation, Oscillations

The relative atmospheric angular momentum (RAM) integrated over the globe is an explicit variable representing the state of the atmospheric general circulation. After removing the annual, semiannual, and higher-frequency components, the filtered global RAM time series is highly correlated with both the Southern Oscillation index and the tropical Pacific sea surface temperature averaged over Area Nino-3. The interannual variation of global RAM is coherent with the poleward propagation of RAM anomalies. The global RAM anomalies reach their minimum values when westerly anomalies emerge in the Tropics and higher latitudes during a cold El Niño-Southern Oscillation (ENSO) event. On the other hand, global RAM anomalies attain their maximum values when westerly anomalies arrive at the subtropics of both hemispheres during a warm ENSO event. IT is demonstrated that the poleward propagation of RAM anomalies results from the flip-flop oscillation of the anomalous circulation between cold and warm ENSO events. Included are graphs of atmospheric angular momentum from 1979 through 1992 extending globally from 90°S to 90°N. (Auth. mod.)

51-2900

On the origin of midlatitude ozone changes: Data analysis and simulations for 1979-1993.

Callis, L.B., Natarajan, M., Lambeth, J.D., Boughner, R.E., *Journal of geophysical research,* Jan. 20, 1997, 102(D1), p.1215-1228, Refs. p.1227-1228.

Ozone, Simulation, Meteorological factors, Solar activity, Aerosols, Variations

Satellite data show large declines in global (4.5%) and mid-latitude (10%) ozone in the mid-1980s and during 1992 and 1993. Analyses of ozone, temperature, and aerosol records and two-dimensional chemical transport simulations have been carried out to develop an understanding of the causes of these changes. Simulations include contemporary homogeneous and heterogeneous chemistry. Also included are the effects of trace gas increases, dilution and denitrification associated with the antarctic ozone destruction, solar cycle effects including relativistic electron precipitation (REP), variable diabatic transport fields and temperature, and variable sulfate aerosol surface area density and acidity. Simulated global and mid-latitude ozone agree very well with observations for the entire period. (Auth. mod.)

51-2901

On the magnitude of transport out of the Antarctic polar vortex.

Wauben, W.M.F., Bintanja, R., Van Velthoven, P.F.J., Kelder, H., *Journal of geophysical research,* Jan. 20, 1997, 102(D1), p.1229-1238, Refs. p.1237-1238.

Atmospheric circulation, Stratosphere, Ozone, Mapping, Simulation, Antarctica

The degree of isolation of the antarctic stratospheric vortex in late winter and spring is investigated quantitatively by using a three-dimensional global tracer transport model, in which the transport is computed from European Centre for Medium-Range Weather Fore-

casts analyzed data. The evolution of the spatial distribution of passive tracers provides information about variations in the vortex structure, as well as about the magnitude of the transport out of the antarctic vortex. The vortex structure revealed by tracers released inside the vortex at 72.5 hPa corresponds well with the satellite-derived distribution of total ozone. The model computations indicate that in late winter and spring of the years 1990-1993, there is a quasi-horizontal cross-vortex transport of about 0.24% per day of the total tracer amount, while per day, 0.83% of the vortex mass descends into the troposphere. This indicates that roughly 65% of the vortex air is flushed out during Aug.-Sep.-Oct. (Auth. mod.)

51-2902

Annual variation of total ozone at Syowa Station, Antarctica.

Chubachi, S., *Journal of geophysical research,* Jan. 20, 1997, 102(D1), p.1349-1354, 21 refs.

Ozone, Atmospheric composition, Seasonal variations, Temperature variations, Air temperature, Antarctica—Showa Station

Analysis of total ozone data from Showa Station for the years 1982 to 1994 reveals several new features in the behavior of ozone depletion. There is no significant year-to-year trend or seasonal variation of total ozone during the polar night (June and July), and the mean value for these months provides a baseline for determining the springtime ozone decrease. Also, the constancy of the polar night data shows that the ozone depletion in spring does not affect the following wintertime total ozone. September total zone relative to the mean total ozone during June and July varies lineraly with that for Aug., showing that the ozone destruction process is active in Aug. and Sep.; this relationship does not appear to continue through Oct. when corruption or displacement of the polar vortex occurs. The magnitude of springtime ozone depletion has increased from the 1980s to the 1990s. Moreover, analysis of temperature at the 100-hPa level shows that final warming at Showa has been delayed 1.2 days per year. This suggests that the polar vortex is stabilized by the development of the antarctic ozone hole. (Auth.)

51-2903

Millimeter wave spectroscopic measurements over the South Pole. 3. The behavior of stratospheric nitric acid through polar fall, winter, and spring.

De Zafra, R.L., Chan, V., Crewell, S., Trimble, C., Reeves, J.M., *Journal of geophysical research,* Jan. 20, 1997, 102(D1), p.1399-1410, Refs. p.1409-1410.

Ozone, Atmospheric composition, Polar stratospheric clouds, Atmospheric circulation, Temperature variations, Antarctica—South Pole

The authors present data from a 9-month series of ground-based measurements of stratospheric nitric acid, made over the South Pole from mid-Apr. 1993 to mid-Jan. 1994. Observations were typically made at 3- to 6-day intervals. These measurements provide the first quasi-continuous series of vertical mixing ratio profiles for this species in the heart of the south polar vortex. Conversion of NO_x to nitric acid by heterogeneous reactions, and its incorporation into polar stratospheric cloud (PSC) particles, along with subsequent gravitational settling, is considered to be the main denitrifying mechanism in the antarctic stratosphere, setting up conditions for ozone destruction at the end of winter. A small increase in HNO_3 was seen between Apr. and the end of May, after which a rapid loss took place below 25 km. By the end of observations in Jan. 1994, mixing ratios and column densities above ca. 15 km had not yet reached more than about half the values seen the previous Apr., indicating that a rather large increase in stratospheric HNO_3 occurs in the early austral fall over the south polar region. (Auth. mod.)

51-2904

Limits on heterogeneous processing in the Antarctic spring vortex from a comparison of measured and modeled chlorine.

Shindell, D.T., De Zafra, R.L., *Journal of geophysical research,* Jan. 20, 1997, 102(D1), p.1441-1449, Refs. p.1448-1449.

Atmospheric circulation, Atmospheric composition, Simulation, Polar stratospheric clouds, Ozone, Antarctica—McMurdo Station

Forty-day photochemical model runs are compared with ground-based stratospheric ClO observations taken during the austral spring of 1993. The purpose is to explore the range of required heterogeneous processing within which one can reproduce the duration and degree of chlorine activation within the antarctic spring vortex. The record ozone losses observed during Sep. of 1993 may be attributed to catalytic loss due to chlorine maintained in active forms by heterogeneous processing despite the sparse particle loading of the antarctic lower stratosphere at that time. The ozone loss rates predicted by the model during the formation of the springtime antarctic ozone hole indeed agree quite well with observations. The one-dimensional model is also able to reproduce both the observed timing and rate for subsequent deactivation of chlorine. Renitrification from PSC evaporation is not required for this deactivation, as HCl reformation is very rapid at low ozone values. (Auth. mod.)

51-2905

Three-dimensional ozone transport during the ozone hole breakup in December 1987.

Atkinson, R.J., Plumb, R.A., *Journal of geophysical research,* Jan. 20, 1997, 102(D1), p.1451-1466, 16 refs.

Ozone, Stratosphere, Atmospheric circulation, Atmospheric composition, Antarctica

The results of a detailed study of the Dec. 1987 ozone hole breakup is reported. A quasi-conservative coordinate transformation technique is used on ozone data from the second stratospheric aerosol and gas experiment (SAGE II) to obtain a three-dimensional description of the hemispheric ozone distribution immediately prior to the event. A contour advection technique is used to describe the stratospheric material evolution during the period, and this provides a detailed depiction of the quasi-horizontal ozone transports which occurred at the time. The calculated dynamically induced total ozone changes during the period are then separated into contributions arising from "vertical" and "horizontal" advection. The potential vorticity tendency form of the quasi-geostrophic omega equation is solved to provide insight into the horizontal scales and vertical domain of the dynamical "forcing" primarily responsible for the vertical advection component. Finally, by imposing a "no ozone hole" ozone distribution during the period, and comparing the resulting ozone distribution with that obtained with the unmodified reconstruction, the authors then isolate a significant component of the observed mid-latitude total ozone changes which was attributable solely to the presence of antarctic ozone depletion. (Auth. mod.)

51-2906

Global evolution of the Mt. Pinatubo volcanic aerosols observed by the infrared limb-sounding instruments CLAES and ISAMS on the Upper Atmosphere Research Satellite.

Lambert, A., et al, *Journal of geophysical research,* Jan. 20, 1997, 102(D1), p.1495-1512, Refs. p.1509-1512.

Aerosols, Atmospheric composition, Meteorological instruments, Infrared reconnaissance, Stratosphere, Spaceborne photography

The cryogenic limb array etalon spectrometer (CLAES) and the improved stratospheric and mesospheric sounder (ISAMS) instruments on board the Upper Atmosphere Research Satellite (UARS) have been used to produce global information on the Mt. Pinatubo volcanic aerosol for the period from Oct. 1991 to Apr. 1993. The satellite infrared extinction measurements near 12 μm are converted into the aerosol-related parameters necessary for modelling the effects of the volcanic aerosol on the aeronomy of the stratosphere and are presented as zonal mean distributions for 80°S to 80°N averaged over 35-day periods. The aerosol composition is derived from the CLAES and ISAMS temperature measurements and the water vapor abundances are obtained from the microwave limb sounder (MLS). The aerosol volume density is obtained from the extinction measurements from which the surface area density and the effective particle radius are estimated. Rate constants are derived for the heterogeneous reactions of N_2O_5 and $ClONO_2$ on the sulphate aerosols. The application of the aerosol parameters to the investigation of tracer transport, heterogeneous chemistry, and radiative transfer is discussed. (Auth. mod.)

51-2907

Effect of stratospheric ozone variations on UV radiation and on tropospheric ozone at high latitudes.

Taalas, P., Damski, J., Kyrö, E., Ginzburg, M., Talamoni, G., *Journal of geophysical research,* Jan. 20, 1997, 102(D1), p.1533-1539, 21 refs.

Ozone, Stratosphere, Atmospheric composition, Ultraviolet radiation, Variations, Antarctica—Marambio Station

A negative trend of stratospheric ozone has been observed, especially at high latitudes, during the last 15 years; a negative trend in total ozone was detected during 1987-1994; -10% at Marambio Station (64°S) and -12% at Sodankylä (67°N). The strongest negative trend was detected during spring. Because stratospheric ozone is controlling the flux of solar UV-B radiation reaching the troposphere, loss of stratospheric ozone may have a strong impact on the destruction and production reactions of tropospheric ozone. The authors have studied the ozone sounding records of 1988-1994 at Marambio Station and at Sodankylä, Finland, to find observational evidence of tropospheric ozone changes due to stratospheric ozone variations. It was found that springtime stratospheric ozone loss has a pronounced impact on the upper tropospheric ozone in both hemispheres. Average ozone deviation of -12.8%, from the 1988 to 1994 means in the 6- to 8-km layer, has been observed in Antarctica during the months with stratospheric ozone loss, and -10.0% in the Arctic, respectively. Daily total ozone records and radiative transfer calculations were used to study the UV-B doses reaching the troposphere. (Auth. mod.)

51-2908

Trends in stratospheric and free tropospheric ozone.

Harris, N.R.P., et al, *Journal of geophysical research,* Jan. 20, 1997, 102(D1), p.1571-1590, Refs. p.1588-1590.

Ozone, Stratosphere, Atmospheric composition, Periodic variations, Aerosols, Ultraviolet radiation, Antarctica

Trends in total ozone have been calculated for the ground-based network and the combined data set from the solar backscatter ultraviolet (SBUV) instruments on Nimbus 7 and NOAA 11. Recent ozone measurements are described for both Antarctica and the rest of the globe. The sulphae aerosol resulting from the eruption of Mount Pinatubo in 1991 and dynamic phenomena seem to have affected ozone levels, particularly at northern mid-latitudes and in the antarctic vortex. However, the record low values observed were partly caused by the long-term trends and the effect on the calculated trends was less than 1.5%/decade. (Auth. mod.)

51-2909

Recent changes in surface elevation of the Antarctic Peninsula ice sheet.

Morris, E.M., Mulvaney, R., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1995, Vol.31, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.1. Edited by M. Kuhn, p.7-15, With German summary. 8 refs.

Glacier mass balance, Geodesy, Height finding, Nunataks, Spacecraft, Ice sheets, Glacier thickness, Glacier melting, Global warming, Sea level, Long range forecasting, Temperature effects, Antarctica—Antarctic Peninsula

Eight over-snow level lines were set up over the period 1972-1986 in Palmer Land and on Alexander I. The height of the snow surface with respect to fixed points on local nunataks was measured using traditional surveying techniques. Further data were collected during the 1992-93 austral summer when satellite surveying techniques were used to remeasure the level lines. Accumulation changes at three of the sites have been determined from ice cores. At two cold sites with mean annual temperatures of -15.2°C and -19.5°C the ice sheet is thickening in response to the increased accumulation associated with warmer temperatures. At two warmer valley glacier sites with mean annual temperatures greater than -11°C and where ablation occurs in the summer, the ice volume is shrinking in response to warmer climate. (Auth. mod.)

51-2910

Possible influence of mesocyclonic activity on snow precipitation in the antarctic coastal zone.

Gallée, H., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1995, Vol.31, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.1. Edited by M. Kuhn, p.17-24, With German summary. 13 refs.

Polar atmospheres, Atmospheric boundary layer, Cloud physics, Snow accumulation, Wind factors, Atmospheric disturbances, Glacier mass balance, Air ice water interaction, Marine meteorology, Marine atmospheres, Mathematical models, Antarctica—Ross Sea

The mesocyclonic activity in the southwestern Ross Sea is examined, with emphasis on its forcing by katabatic winds. The three-dimensional version of primitive equation model is used, in which a representation of cloud microphysical processes has been introduced. Idealized boundary conditions are prescribed. In particular, the ocean is assumed to be completely ice-free. This case corresponds to a fall situation which coincides with the climatological maximum of estimated precipitation at McMurdo Station on Ross I. Due to the propagation of katabatic winds over the ocean, boundary-layer fronts form. Clouds and snow precipitation are generated in the fronts, in particular over McMurdo Sound. (Auth. mod.)

51-2911

Assessment of the mass budgets of Antarctica and Greenland using accumulation derived from remotely sensed data in areas of dry snow.

Giovinetto, M.B., Zwally, H.J., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1995, Vol.31, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.1. Edited by M. Kuhn, p.25-37, With German summary. 38 refs.

Glacier mass balance, Snow accumulation, Snow physics, Desiccation, Physical properties, Forecasting, Ice volume, Snow line, Remote sensing, Brightness, Snow surveys, Antarctica—East Antarctica, Greenland, Antarctica—West Antarctica

Net accumulation at the surface or surface balance values derived elsewhere for areas of dry snow in Antarctica and Greenland are used to produce revised estimates of accumulation in the areas delimited

by the equilibrium line. The values were derived for grid-point locations 100 km apart using remotely sensed brightness temperature and surface temperature. The grid-point approach is used to revise accumulation estimates based on either contouring or parameterization of field data for each ice sheet. Integrated for the area delimited by the equilibrium line, and relative to various estimates in recent literature, the revised estimates of accumulation suggest e.g. an increase of 7% for Antarctica including the ice shelves, and decreases of 3% for the grounded ice in Antarctica and of at least 12% for Greenland. These overall revised estimates are used to assess the changes they would introduce in either recent mass budget estimates for Antarctica including the ice shelves, or in mass budget estimates that could be produced from recent estimates of mass input and output for the grounded ice in Antarctica and for Greenland. Suggestions are made on probable improvements for estimates of accumulation and the possible use of new technology to determine the mass budget of the ice sheets. (Auth. mod.)

51-2912

Annual changes in sea ice extent and of accumulation on ice sheets: implications for sea level variability.

Giovinetto, M.B., Zwally, H.J., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1995, Vol.31, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.1. Edited by M. Kuhn, p.39-49, With German summary. 33 refs.

Oceanography, Sea level, Ice sheets, Sea ice distribution, Grounded ice, Ice volume, Glacier mass balance, Long range forecasting, Statistical analysis, Periodic variations, Greenland, Antarctica—West Antarctica, Antarctica—East Antarctica

Multivariate analyses of mean annual net accumulation at the surface on the conterminous grounded ice sheets of East Antarctica, West Antarctica and Greenland are performed using grid-point values 100 km apart. The independent variables are latitude, surface elevation, mean annual surface temperature as an index of tropospheric temperature, and mean annual distance to open ocean as a source of moisture. The results suggest that changes in sea ice extent of the magnitude observed in recent decades could indirectly contribute up to ±0.2 mm/y to the observed annual changes of sea level. (Auth. mod.)

51-2913

Mass balance of the Greenland ice sheet: a century of progress but there is still much to do.

Braithwaite, R.J., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1995, Vol.31, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.1. Edited by M. Kuhn, p.51-56, With German summary. 45 refs.

Ice sheets, Glacier mass balance, Glacier oscillation, Glacier surveys, Accuracy, Long range forecasting, Atmospheric boundary layer, Glacier melting, Climatic changes, Ice air interface, Greenland

51-2914

Mass balance measurements in the Søndre Strømfjord area in the periods 1990-1994.

Van de Wal, R.S.W., et al, *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1995, Vol.31, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.1. Edited by M. Kuhn, p.57-63, With German summary. 11 refs.

Ice sheets, Glacier mass balance, Seasonal variations, Glacier surveys, Glacier ablation, Albedo, Remote sensing, Height finding, Radiation absorption, Greenland—Søndre Strømfjord

51-2915

Determination of the dynamical behaviour of the Greenland ice sheet.

Salbach, H., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1995, Vol.31, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.1. Edited by M. Kuhn, p.65-71, With German summary. 2 refs.

Glacier surveys, Geophysical surveys, Geodetic surveys, Glacier mass balance, Ice sheets, Profiles, Glacier flow, Glacier oscillation, Glacier thickness, Geophysical surveys, Seasonal variations, Greenland

51-2916

Mean net accumulation of ten glacier basins in Svalbard estimated from detection of radioactive layers in shallow ice cores.

Pourchet, M., Lefauconnier, B., Pinglot, J.F., Hagen, J.O., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1995, Vol.31, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.1. Edited by M. Kuhn, p.73-84, With German summary. 22 refs.

Glacier surveys, Glacier mass balance, Ice sheets, Radioactivity, Layers, Ice cores, Stratification, Spectroscopy, Radioactive isotopes, Seasonal variations, Norway—Svalbard

51-2917

Determination of changes in volume of Gåsbreen using different geodetic methods.

Schöner, M., Schöner, W., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1995, Vol.31, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.1. Edited by M. Kuhn, p.85-91, With German summary. 9 refs.

Glacier surveys, Glacier mass balance, Ice volume, Geodetic surveys, Height finding, Photogrammetric surveys, Photointerpretation, Accuracy, Correlation, Periodic variations, Statistical analysis, Norway—Spitsbergen

51-2918

Mass balance of a small valley glacier in the Canadian High Arctic, Ellesmere Island, Northwest Territories.

Wolfe, P.M., English, M.C., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1995, Vol.31, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.1. Edited by M. Kuhn, p.93-103, With German summary. 8 refs.

Glacier surveys, Glacier mass balance, Seasonal variations, Glacier melting, Height finding, Stratigraphy, Snow stakes, Canada—Northwest Territories—Ellesmere Island

51-2919

Mass balance studies in northern Sweden.

Holmlund, P., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1995, Vol.31, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.1. Edited by M. Kuhn, p.105-114, With German summary. 32 refs.

Glacier surveys, Glacier mass balance, Photogrammetric surveys, Periodic variations, Glacier oscillation, Climatic changes, Surface temperature, Snow accumulation, Correlation, Statistical analysis, Sweden—Storglaciären

51-2920

Plateau and valley glaciers in north Norway: responses to climate change over the last 100 years.

Whalley, W.B., Gordon, J.E., Gellatly, A.F., Hansom, J.G., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1995, Vol.31, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.1. Edited by M. Kuhn, p.115-124, With German summary. 36 refs.

Glacier surveys, Glacier oscillation, Climatic changes, Climatic factors, Glacier mass balance, Models, Moraines, Norway

51-2921

Fluctuations of glaciers in Lyngsdalen, Troms, Norway, during the 20th century.

Gordon, J.E., Whalley, W.B., Gellatly, A.F., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1995, Vol.31, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.1. Edited by M. Kuhn, p.125-134, With German summary. 18 refs.

Glacier surveys, Glacier oscillation, Glacier mass balance, Profiles, Height finding, Moraines, Ice edge, Climatic changes, Glacial meteorology, Statistical analysis, Norway—Lyngsdalen

51-2922

Research on glacier mass balance in the Italian Alps.

Zanon, G., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1995, Vol.31, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.1. Edited by M. Kuhn, p.135-142, With German summary. 12 refs.

Glacier surveys, Mountain glaciers, Alpine glaciation, Glacier mass balance, Seasonal variations, Glacier tongues, Altitude, Glacier oscillation, Italy—Alps

51-2923

Elevation and volume changes in the Caresèr Glacier (Ortles-Cevedale Group, central Alps), 1967-1990.

Giada, M., Zanon, G., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1995, Vol.31, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.1. Edited by M. Kuhn, p.143-147, With German summary. 6 refs.

Mountain glaciers, Glacier surveys, Photogrammetric surveys, Alpine glaciation, Glacier oscillation, Glacier mass balance, Ice volume, Periodic variations, Correlation, Altitude, Snow water equivalent, Italy—Alps

51-2924

Glacier mass balance: some results from central Italian Alps.

Barsanti, M., Pelfini, M., Smiraglia, C., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1995, Vol.31, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.1. Edited by M. Kuhn, p.149-157, With German summary. 13 refs.

Glacier surveys, Glacier mass balance, Alpine glaciation, Mountain glaciers, Glacier oscillation, Statistical analysis, Snow water equivalent, Glacier ablation, Climatic factors, Correlation, Trees (plants), Age determination, Italy—Alps

51-2925

Glacier mass balance studies in the Swiss Alps.

Aellen, M., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1995, Vol.31, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.1. Edited by M. Kuhn, p.159-168, With German summary. 40 refs.

Glacier surveys, Mountain glaciers, Alpine glaciation, Glacier mass balance, Glacier oscillation, Glacier flow, Snow stakes, Geodetic surveys, Seasonal variations, Statistical analysis, Switzerland—Alps

51-2926

Long-term changes of glaciers in the Sonnblick region in the Austrian Alps.

Böhm, R., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1995, Vol.31, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.1. Edited by M. Kuhn, p.169-170.

Glacier surveys, Glacier oscillation, Alpine glaciation, Glacier mass balance, Correlation, Glacier ablation, Austria—Alps

51-2927

Mass balance of very small glaciers.

Kuhn, M., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1995, Vol.31, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.1. Edited by M. Kuhn, p.171-179, With German summary. 28 refs.

Glacier mass balance, Ice volume, Mountain glaciers, Spectra, Cirque glaciers, Terminology, Classifications, Snow line, Glacier alimentation

51-2928

Behaviour of the Bavarian glaciers: results from surveying and mass balance modelling.

Escher-Vetter, H., Rentsch, H., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1995, Vol.31, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.1. Edited by M. Kuhn, p.181-187, With German summary. 11 refs.

Glacier mass balance, Glacier surveys, Alpine glaciation, Glacier oscillation, Ice volume, Geodetic surveys, Glacier ablation, Models, Correlation, Germany—Bavaria

51-2929

Mass balance of Glacier de Sarennes.

Valla, F., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1995, Vol.31, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.1. Edited by M. Kuhn, p.189-197, With German summary. 10 refs.

Glacier mass balance, Glacier surveys, Glacier oscillation, Alpine glaciation, Snow water equivalent, Seasonal variations, Glacier ablation, Glacial meteorology, Correlation, Statistical analysis, France—Alps

51-2930

Little Ice Age glacier fluctuations in the Pyrénées.

Grove, J.M., Gellatly, A.F., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1995, Vol.31, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.1. Edited by M. Kuhn, p.199-206, With German summary. 27 refs.

Glacier surveys, Glacier mass balance, Glacier oscillation, Mountain glaciers, Periodic variations, Statistical analysis, France—Pyrenees

51-2931

Climate and glacier response in the Pyrénées, 1878-1994.

McGregor, G.R., Gellatly, A.F., Bücher, A., Grove, J.M., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1995, Vol.31, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.1. Edited by M. Kuhn, p.207-214, With German summary. 15 refs.

Glacier surveys, Mountain glaciers, Glacier oscillation, Climatic changes, Glacier ablation, Precipitation (meteorology), Snow accumulation, Statistical analysis, France—Pyrenees

51-2932

Experience from observations of glacier fluctuations in the Territory of the former USSR.

Kotliakov, V.M., Osipova, G.B., Popovnin, V.V., Tsvetkov, D.G., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1996, Vol.32, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.2. Edited by M. Kuhn, p.5-14, With German summary. 6 refs.

Glacier surveys, Glacier oscillation, Mountain glaciers, Glacier mass balance, Glacier surges, Periodic variations, Research projects, Correlation, Statistical analysis, Russia

51-2933

Modern evolution of the Djankuat Glacier in the Caucasus.

Popovnin, V.V., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1996, Vol.32, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.2. Edited by M. Kuhn, p.15-23, With German summary. 8 refs.

Glacier surveys, Mountain glaciers, Glacier mass balance, Altitude, Glacier oscillation, Seasonal variations, Snow accumulation, Statistical analysis, Forecasting, Russia—Caucasus Mountains

51-2934

Reconstruction and forecast of mass balance and shape of Djankuat Glacier (Caucasus Mountains).

Kunakhovich, M.G., Sokal'skaia, A.M., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1996, Vol.32, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.2. Edited by M. Kuhn, p.25-31, With German summary. 15 refs.

Glacier surveys, Glacier mass balance, Glacier oscillation, Climatic changes, Altitude, Glacier flow, Glacier thickness, Profiles, Periodic variations, Models, Forecasting, Russia—Caucasus Mountains

51-2935

Reaction of glaciers in West Tien Shan to climate changes.

Glazyrin, G.E., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1996, Vol.32, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.2. Edited by M. Kuhn, p.33-39, With German summary. 12 refs.

Mountain glaciers, Glacier oscillation, Glacier mass balance, Altitude, Climatic changes, Glacial meteorology, Meltwater, Long range forecasting, Runoff forecasting, Mathematical models, Uzbekistan—Tien Shan

51-2936

Mass balance and runoff of Tuyuksu Glacier and the north slope of the Zailiĭskiĭ Alatau Range, Tien Shan.

Diurgerov, M.B., Uvarov, V.N., Kostiashkina, T.E., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1996, Vol.32, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.2. Edited by M. Kuhn, p.41-54, With German summary. 39 refs.

Glacier surveys, Mountain glaciers, Glacier mass balance, Glacier oscillation, Runoff forecasting, Glacial meteorology, Climatic changes, Global warming, Ice melting, Kazakhstan—Tien Shan, Kazakhstan—Tuyuksu Glacier

51-2937

Glacier mass balance studies in the Karakoram—accomplishments and challenges.

Young, G.J., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1996, Vol.32, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.2. Edited by M. Kuhn, p.55-60, With German summary. 27 refs.

Glacier surveys, Mountain glaciers, Glacier mass balance, Research projects, International cooperation, Karakoram Mountains

51-2938

Characteristics of mass balance of summer-accumulation type glaciers in the Himalayas and Tibetan Plateau.

Ageta, Y., Fujita, K., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1996, Vol.32, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.2. Edited by M. Kuhn, p.61-65, With German summary. 7 refs.

Mountain glaciers, Glacier mass balance, Seasonal variations, Glacier oscillation, Statistical analysis, Altitude, Hydrologic cycle, Climatic factors, China—Himalaya Mountains, China—Tibet

51-2939

Experimental study of climate and ablation at the equilibrium line of Dongkemadi Glacier, Tanggula Mountains, Qinghai-Xizang Plateau.

Zhang, Y.S., Yao, T.D., Xie, Z.C., Fujita, K., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1996, Vol.32, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.2. Edited by M. Kuhn, p.67-74, With German summary. 5 refs.

Glacier surveys, Mountain glaciers, Glacier mass balance, Glacier ablation, Glacier oscillation, Climatic factors, Snow depth, Radiation balance, Glacial meteorology, Vapor pressure, Statistical analysis, Snow air interface, China—Qinghai-Xizang Plateau

51-2940

Mass balance profiles on tropical glaciers.

Kaser, G., Hastenrath, S., Ames, A., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1996, Vol.32, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.2. Edited by M. Kuhn, p.75-81.

Glacier surveys, Alpine glaciation, Glacier mass balance, Profiles, Climatic changes, Global warming, Seasonal variations, Snow line, Glacier ablation, Statistical analysis

51-2941

Mass balance and ice flow of the Uruashraju Glacier, Cordillera Blanca, Peru.

Ames, A., Hastenrath, S., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1996, Vol.32, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.2. Edited by M. Kuhn, p.83-89, With German summary. 6 refs.

Glacier surveys, Glacier flow, Glacier oscillation, Glacial hydrology, Glacier mass balance, Mountain glaciers, Glacier melting, Profiles, Snow water equivalent, Statistical analysis, Peru—Uruashraju Glacier

51-2942

Modern glacier fluctuations in the Huascarán-Chopicalqui Massif of the Cordillera Blanca, Perú.

Kaser, G., Georges, C., Ames, A., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1996, Vol.32, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.2. Edited by M. Kuhn, p.91-99, With German summary. 20 refs.

Glacier surveys, Mountain glaciers, Glacier oscillation, Glacier mass balance, Photogrammetric surveys, Altitude, Climatic changes, Mathematical models, Ice heat flux, Temperature effects, Peru—Cordillera Blanca

51-2943

Glacier mass balance analysis and reconstruction in the Cajon del Rubio, Mendoza, Argentina.

Leiva, J.C., Cabrera, G.A., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1996, Vol.32, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.2. Edited by M. Kuhn, p.101-107, With German summary. 6 refs.

Mountain glaciers, Glacier mass balance, Alpine glaciation, Glacier surveys, Periodic variations, Snow water equivalent, Statistical analysis, Correlation, Argentina—Cajon del Rubio

51-2944

Glacier fluctuations in the Ruwenzori Range (East Africa) during the 20th century—a preliminary report.

Kaser, G., Noggler, B., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1996, Vol.32, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.2. Edited by M. Kuhn, p.109-117, With German summary. 25 refs.

Mountain glaciers, Glacier oscillation, Glacier surveys, Glacier ablation, Climatic factors, Ice edge, Altitude, Periodic variations, Uganda—Ruwenzori Range

51-2945

Multivariate statistical modelling of equilibrium line altitudes: Hintereisferner (Ötztal)—Stubacher Sonnblickkees (Hohe Tauern).

Kerschner, H., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1996, Vol.32, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.2. Edited by M. Kuhn, p.119-127, With German summary. 19 refs.

Mountain glaciers, Alpine glaciation, Altitude, Glacial meteorology, Degree days, Air temperature, Mathematical models, Statistical analysis, Correlation, Austria—Alps

51-2946

Mass balance at the steady state equilibrium line—altitude and its applications.

Xie, Z.C., Ding, L.F., Liu, C.H., Liu, S.Y., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1996, Vol.32, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.2. Edited by M. Kuhn, p.129-135, With German summary. 19 refs.

Glacier mass balance, Altitude, Glacier surveys, Glacier ablation, Profiles, Statistical analysis, Correlation, Snow line, Theories

51-2947

Reconstruction of the summer mass balance of Hintereisferner since 1953.

Hofinger, S., Kuhn, M., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1996, Vol.32, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.2. Edited by M. Kuhn, p.137-149, With German summary. 29 refs.

Glacier surveys, Mountain glaciers, Alpine glaciation, Glacier mass balance, Periodic variations, Glacier oscillation, Glacial meteorology, Snow accumulation, Radiation balance, Turbulent exchange, Albedo, Models, Radiance, Statistical analysis, Austria—Hintereisferner

51-2948

Numerical simulation of fluctuations of Hintereisferner, Ötztal Alps, back to 1850 A.D.

Schlosser, E., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1996, Vol.32, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.2. Edited by M. Kuhn, p.151-152.

Alpine glaciation, Mountain glaciers, Glacier oscillation, Glacier mass balance, Glacier thickness, Simulation, Simulation, Austria—Alps

51-2949

Wurtenkees: reconstruction of a 100 years time series of mass balance.

Hammer, N., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1996, Vol.32, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.2. Edited by M. Kuhn, p.153-157, With German summary. 6 refs.

Alpine glaciation, Mountain glaciers, Glacier oscillation, Glacier mass balance, Periodic variations, Degree days, Statistical analysis, Correlation, Glacial meteorology, Austria—Alps

51-2950

Long-term variations of mountain glaciers in the former USSR (FSU)—part 1. Mass balance reconstructions.

Mikhalenko, V.N., Solomina, O.N., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1996, Vol.32, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.2. Edited by M. Kuhn, p.159-166, With German summary. 15 refs.

Mountain glaciers, Glacier oscillation, Glacier ablation, Glacier mass balance, Climatic changes, Statistical analysis, Correlation, Russia

51-2951

Optimization of mountain glacier mass balance measurements.

Kamnianskiĭ, G.M., Pertziger, F.I., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1996, Vol.32, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.2. Edited by M. Kuhn, p.167-175, With German summary. 8 refs.

Glacier surveys, Mountain glaciers, Glacier mass balance, Profiles, Snow stakes, Snow line, Altitude, Correlation, Seasonal variations, Statistical analysis, Accuracy

51-2952

Substitution of long-term mass balance data by measurements of one summer.

Diurgerov, M.B., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1996, Vol.32, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.2. Edited by M. Kuhn, p.177-184, With German summary. 15 refs.

Glacier surveys, Mountain glaciers, Glacier mass balance, Snow line, Altitude, Profiles, Seasonal variations, Forecasting, Statistical analysis, Correlation

51-2953

Results of the precipitation and snow-stake network in the glacier region of Sonnblick.

Auer, I., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1996, Vol.32, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.2. Edited by M. Kuhn, p.185-192, With German summary. 6 refs.

Glacier surveys, Mountain glaciers, Alpine glaciation, Glacial meteorology, Snow stakes, Snow depth, Altitude, Statistical analysis, Correlation, Periodic variations, Austria—Sonnblick

51-2954

Radar measurements of annual snow accumulation rates.

Holmlund, P., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1996, Vol.32, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.2. Edited by M. Kuhn, p.193-196, With German summary. 4 refs.

Glacier surveys, Glacier mass balance, Snow accumulation, Probes, Snow composition, Coring, Profiles, Snow density, Radio echo soundings, Computer applications, Seasonal variations

51-2955

Long-term variations of mountain glaciers in the former USSR (FSU)—part 2. Lichenometry and dendrochronology.

Solomina, O.N., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1996, Vol.32, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.2. Edited by M. Kuhn, p.197-205, With German summary. 24 refs.

Mountain glaciers, Glacier oscillation, Age determination, Lichens, Forest lines, Moraines, Temperature variations, Climatic changes, Cooling, Statistical analysis, Correlation, Russia

51-2956

Reconstructing glacier history in Tyrol by means of tree-ring investigations.

Nicolussi, K., Patzelt, G., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1996, Vol.32, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.2. Edited by M. Kuhn, p.207-215, With German summary. 24 refs.

Glacier surveys, Glacier oscillation, Forest lines, Growth, Age determination, Glacier mass balance, Glacier ablation, Periodic variations, Statistical analysis, Correlation, Austria—Alps

51-2957

Late Holocene and historical changes of glacier cover and related sea level in Greenland.

Weidick, A., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1996, Vol.32, International Commission on Snow and Ice. Symposium on Measurement and Reconstruction of Glacier Mass Balance, Pt.2. Edited by M. Kuhn, p.217-224, With German summary. 15 refs.

Ice sheets, Glacier oscillation, Glacial geology, Glacier ablation, Ice edge, Shoreline modification, Sea level, Ice volume, Geochronology, Greenland

51-2958

Cometary activity of Chiron: a stratigraphic model.

Fanale, F.P., Salvail, J.R., *Icarus,* Feb. 1997, 125(2), p.397-405, 27 refs.

Extraterrestrial ice, Ice physics, Ice composition, Stratigraphy, Ice sublimation, Amorphous ice, Phase transformations, Vapor pressure, Geochemistry, Porous materials, Turbulent diffusion, Mathematical models, Theories, Mass transfer

51-2959

Comet lightcurves: effects of active regions and topography.

Colwell, J.E., *Icarus,* Feb. 1997, 125(2), p.406-415, 38 refs.

Extraterrestrial ice, Ice physics, Ice composition, Ice sublimation, Topographic effects, Surface roughness, Insolation, Brightness, Orientation, Ice erosion, Turbulent diffusion, Heat flux, Mathematical models, Water transport, Seasonal variations

51-2960

Model of outflow generation by hydrothermal underpressure drainage in volcano-tectonic environment, (Shalbatana Vallis Mars).

Cabrol, N.A., Grin, E.A., Dawidowicz, G., *Icarus,* Feb. 1997, 125(2), p.455-464, 38 refs.

Mars (planet), Regolith, Tectonics, Hydrothermal processes, Magma, Frozen ground expansion, Geomorphology, Vapor diffusion, Geocryology, Ground ice, Models, Geological maps

51-2961

Source of the high C_2H_6/CH_4 ratio in comet Hyakutake.

Notesco, G., Laufer, D., Bar-Nun, A., *Icarus,* Feb. 1997, 125(2), p.471-473, 21 refs.

Extraterrestrial ice, Ice physics, Ice sublimation, Vapor diffusion, Hydrocarbons, Natural gas, Condensation, Ice vapor interface, Simulation, Ice formation, Cosmic dust, Theories

51-2962

Effects of drainage and temperature on carbon balance of tussock tundra microcosms.

Johnson, L.C., et al, *Oecologia,* Dec. 1996, 108(4), p.737-748, 45 refs.

Tundra vegetation, Tundra soils, Ecosystems, Photosynthesis, Water table, Soil water, Moisture transfer, Surface drainage, Temperature effects, Carbon dioxide, Geochemical cycles, Simulation, Greenhouse effect, Soil air interface

51-2963

Sulphur isotope composition of stream water, moss and humus from eight arctic catchments in the Kola Peninsula region (NW Russia, N Finland, NE Norway).

de Caritat, P., Krouse, H.R., Hutcheon, I., *Water, air, and soil pollution,* Feb. 1997, 94(1-2), p.191-208, 37 refs.

Arctic landscapes, River basins, Hydrogeology, Air pollution, Aerosols, Streams, Ecosystems, Mosses, Organic soils, Sampling, Environmental tests, Isotope analysis, Russia—Kola Peninsula

51-2964

Seasonal variations in heavy metals concentrations in present day Greenland snow.

Candelone, J.P., Jaffrezo, J.L., Hong, S.M., Davidson, C.I., Boutron, C.F., *Science of the total environment,* Dec. 20, 1996, 193(2), p.101-110, 39 refs.

Ice sheets, Climatology, Air pollution, Aerosols, Metals, Sampling, Environmental tests, Atmospheric composition, Snow composition, Snow impurities, Chemical analysis, Spectroscopy, Seasonal variations, Origin, Greenland

51-2965

Resilient modulus testing of materials from Mn/ROAD, Phase 1.

Berg, R.L., Bigl, S.R., Stark, J.A., Durell, G.D., SR 96-19, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Sep. 1996, 93p., ADA-321 627, 9 refs.

Subgrades, Pavement bases, Cold weather tests, Freeze thaw tests

The U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) conducted resilient modulus tests on materials from the Mn/ROAD test site for the Minnesota Department of Transportation. Materials tested included samples of the lean clay subgrade at the site and the two extreme grades of base designed specifically for Mn/ROAD. Some specimens were tested in both frozen and subsequently "thawed" conditions; others were tested at room temperature without ever having been frozen. Researchers peformed linear regression analysis on the data to develop equations that predict frozen modulus based on unfrozen water content and unfrozen modulus based on stress, degree of saturation and density. The authors also reanalyzed data from two previously tested materials. CRREL can use the study's equations in the Mechanistic Pavement Design and Evaluation Procedure under development at CRREL to predict estimated damage in some Mn/ROAD test sections.

51-2966

Freezing temperature protection admixture for Portland cement concrete.

Korhonen, C.J., Brook, J.W., SR 96-28, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Oct. 1996, 38p., ADA-321 468, 11 refs.

Concrete admixtures, Cold weather construction, Winter concreting, Countermeasures, Concrete strength, Concrete hardening, Thermal insulation

A number of experimental admixtures were compared to Pozzutec 20 admixture for their ability to protect fresh concrete from freezing and for increasing the rate of cement hydration at below-freezing temperatures. The commercial accelerator and low-temperature admixture Pozzutec 20 served as the reference admixture for this project as it has been a successful product of Master Builders for winter concreting during the past several years. Over thirty-five experimental admixture candidates were tested. Of these, one experimental admixture, code-named EY-11, a nonchloride admixture, outperformed all the others and was selected as the admixture to be considered for future commercialization. It was demonstrated by laboratory evaluation that the Pozzutec 20 admixture did not contribute to corrosion of embedded steel reinforcement. The EY-11 admixture, although still under examination, also did not contribute to corrosion in a newer and different laboratory test. Based on a knowledge of its constituents, EY-11 is not expected to contribute to corrosion under laboratory conditions or in the field. The low and medium dosages (60 and 100 mL/kg), of EY-11 produced freeze-thaw-durable concrete, but the highest dosage examined, 160 mL/kg, did not. The middle dosage (100 mL/kg) protected concrete down to the low-temperature goal of this project, -5°C. The prototype admixture, EY-11, affords superior low-temperature protection compared to existing accelerating admixtures, as well as good durability. Unfortunately, it did not provide the desirable rapid setting and strength gain of concrete at above-freezing temperatures that field engineers and concrete technicians would like.

51-2967

Material testing and initial pavement design modeling: Minnesota Road Research Project.

Bigl, S.R., Berg, R.L., CR 96-14, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* Sep. 1996, 45p., ADA-321 629, 26 refs.

Pavements, Pavement bases, Design, Subgrades, Frost heave, Frost penetration, Cold weather performance, Thaw depth, Computer programs, Models

Between Jan. 1990 and Dec. 1994, a study verified and applied a Corps of Engineers-developed mechanistic design and evaluation method for pavements in seasonal frost areas as part of a Construction Productivity Advancement Research (CPAR) project between the Minnesota Department of Transportation (Mn/DOT) and the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL). The study involved four primary components. Mn/DOT constructed a full scale pavement test facility adjacent to Interstate 94, referred to as the Minnesota Road Research Project (Mn/ROAD). CRREL performed extensive laboratory tests on the base and subgrade materials from Mn/ROAD to characterize them and their behavior under seasonal frost conditions. Laboratory tests provided the input parameters necessary for the study's third component, modeling with the CRREL Mechanistic Pavement Design and Evaluation Procedure. The modeling effort was conducted in three phases, which investigated the effects of freeze season characteristics, water table position, asphalt model and subgrade characteristics on the predicted performance of selected Mn/ROAD test sections. Delays in construction on the Mn/ROAD facility prevented the completion of the study's fourth component—using performance data from Mn/ROAD to validate the mechanistic pavement design and evaluation procedure. The report details results from the other three components.

51-2968

Device for mechanical freeze-thaw conditioning of alum sludge.

Martel, C.J., Affleck, R.T., Yushak, M.L., CR 96-15, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* Dec. 1996, 21p., ADA-322 002, 15 refs.

Water treatment, Waste disposal, Sludges, Design criteria, Freeze thaw tests, Freezing rate, Grain size, Cost analysis

This report contains the results of a study to develop a mechanical device for dewatering alum sludge by freeze-thaw. This proposed device is a combination of two conventional unit operations: a vacuum filter and a blast freezer. Bench-scale studies were conducted to evaluate this concept and develop preliminary design criteria. The results of filter leaf tests indicate that a suitable sludge layer could be collected on a cloth medium at a vacuum level of only 100 mm of Hg and a 5.0-minute filtration time. The volume of sludge was reduced by 67%. The freezing tests indicated that low freezing rate and a high initial solids content had a tendency to produce large alum sludge particles. However, fast freezing rates could be achieved without reducing the effective grain size below that of a fine sand. Curing time had no effect on grain size. The electrical cost of freezing sludge with this device was estimated to be $0.004/m^3, which is not expensive in relation to the total cost of water treatment which is approximately $0.25 to $0.50/m^3.

51-2969

Stability dependent parameterisations of vertical mixing in ocean general circulation models.

Reason, C.J.C., *Meteorology and atmospheric physics,* 1996, 61(1-2), p.1-18, 40 refs.

Atmospheric circulation, Climate, Models, Ocean currents

Parameterizations of mixing are investigated in simulations of ocean climate using a global ocean general circulation model (OGCM). Focus is placed on the sensitivity of the large scale circulation, water mass formation, and transport of heat as measures of the model's ability to represent current climate. The model resolution is typical of OGCMs being coupled to atmospheric. Under the assumption of constant vertical eddy coefficients, (the control case), the model climatology displays acceptable values of North Atlantic Deep Water formation, Antarctic Circumpolar Current (ACC) transport, and Indonesian through-flow but an excessively deep and diffuse pycnocline structure with weak stratification in the deep ocean. (Auth. mod.)

51-2970

Estimates of threshold wind speeds for snow transport using meteorological data.

Li, L., Pomeroy, J.W., *Journal of applied meteorology,* Mar. 1997, 36(3), p.205-213, 35 refs.

Snow cover, Wind velocity, Blowing snow, Weather observations

51-2971

Effect of seasonality of snow accumulation and melt on snow surface energy exchanges at a continental alpine site.

Cline, D.W., *Journal of applied meteorology,* Jan. 1997, 36(1), p.32-51, 33 refs.

Snow accumulation, Snow melting, Air temperature, Humidity, Seasonal variations, Snow heat flux, Snow air interface, United States—Colorado—Front Range

51-2972

Numerical comparison of two ice crystal formation mechanisms on snowfall enhancement from ground-based aerosol generators.

Li, Z., Pitter, R.L., *Journal of applied meteorology,* Jan. 1997, 36(1), p.70-85, 46 refs.

Ice crystals, Snowfall, Aerosols, Smoke generators, United States—California—Sierra Nevada

51-2973

Proceedings.

International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996, Harbin, China, University of Harbin Industry Technology Press, 1996, 328p., Refs. passim. Organized by the Heilongjiang Research Institute of Cold Region Construction, Harbin, China, and the Permafrost Institute, Siberian Branch, Russian Academy of Sciences, Yakutsk, Russia. For individual papers see 51-2974 through 51-3056.

Cold weather construction, Foundations, Subgrade soils, Soil freezing, Soil stabilization, Frozen ground strength, Frozen ground settling, Frost heave, Frost protection, Frost resistance, Permafrost beneath structures, Permafrost preservation, Winter concreting, Concrete strength

51-2974

Prognosis methods of interaction of engineering constructions with permafrost.

Gorelik, IA.B., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.1-3,316, With Chinese summary. 15 refs.

Wells, Ground thawing, Thaw depth, Permafrost beneath structures, Permafrost heat transfer, Permafrost preservation, Frost heave, Frost protection, Heat pipes, Thermal insulation, Mathematical models

51-2975

Numerical simulation of temperature field for artificial freezing walls.

He, C.X., Xu, X.Z., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.4-6,316, With Chinese summary. 6 refs.

Soil freezing, Artificial freezing, Soil stabilization, Frozen ground temperature, Frozen ground thermodynamics, Buildings, Foundations, Mathematical models

51-2976

New methods of strengthening roadbed bases on very icy permafrost soils.

Kondrat'ev, V.G., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.7-10,316, With Chinese title. 12 refs.

Roadbeds, Embankments, Permafrost beneath roads, Permafrost preservation, Subgrade soils, Soil stabilization, Subgrade maintenance, Road maintenance

51-2977

On new types of walls of heat preservation and power saving in the frigid zone.

Yan, Z.P., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.11-15,316, With Chinese summary.

Residential buildings, Walls, Thermal insulation, Weatherproofing, Cold weather construction, China—Inner Mongolia

51-2978

Prediction experience of the temperature conditions of hydraulic works in the permafrost area.

Sobol', S.V., Bitiurin, A.K., Grandilevskiĭ, V.N., Fevralev, A.V., IAnchenko, A.V., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.16-17,316, With Chinese summary.

Earth dams, Hydraulic structures, Permafrost beneath structures, Permafrost beneath rivers, Permafrost thermal properties, Frozen ground temperature, Ground thawing, Thaw depth, Thaw weakening, Russia—Lena River, Russia—Amguema River, Russia—Vilyuy River

51-2979

Determination of the overhead height of heating houses in permafrost areas.

Li, Y.W., Zhang, L.H., Gao, A.D., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.18-21,316, With Chinese summary. 2 refs.

Buildings, Houses, Floors, Permafrost beneath structures, Permafrost preservation, Ventilation, Cold weather construction, Design criteria, China—Inner Mongolia

51-2980

Field studies of the dynamics of temperature regime, pressure and soil deformations around the reinforced concrete spillway under central Yakutia conditions.

Zhang, R.V., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.22-24,317, With Chinese summary.

Spillways, Hydraulic structures, Concrete strength, Permafrost beneath structures, Permafrost beneath rivers, Frozen ground thermodynamics, Frost heave, Frozen ground settling, Frozen ground temperature, Soil freezing, Ground thawing, Russia—Yakutia

51-2981

Application of insulated foundations.

Wang, J.G., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.25-26,317, With Chinese summary. 1 ref.

Buildings, Foundations, Frost heave, Frost protection, Thermal insulation, Cold weather construction

51-2982

Physical model study on the interaction between aqueducts and freezing, thawing and frozen soils.

Zhang, R.V., Zhu, L.N., Zhang, C.Q., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.27-29,317, With Chinese summary.

Channels (waterways), Hydraulic structures, Frost action, Frost heave, Frozen ground settling, Environmental tests

51-2983

Prevention and treatment on building frost damage.

Qu, K.S., Shen, F., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.30-31,317, With Chinese summary.

Buildings, Foundations, Frost heave, Frost action, Frost protection, Cold weather construction

51-2984

Prediction of temperature conditions of the designed Telmama dam to be constructed during five-year period.

Gorokhov, E.N., Ageeva, V.V., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.32-34,317, With Chinese summary. 4 refs.

Earth dams, Hydraulic structures, Rock fills, Permafrost beneath rivers, Permafrost beneath structures, Permafrost heat transfer, Permafrost preservation, Frost protection, Cold weather construction, Thermal analysis, Design criteria, Russia—Mamakan River

51-2985

Effect of thaw-sandwich under the asphalt pavement on stability of Qinghai-Tibet Highway in permafrost regions.

Wu, Q.B., Tong, C.J., Mi, H.Z., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.35-37,317, With Chinese summary. 5 refs.

Permafrost beneath roads, Permafrost depth, Active layer, Taliks, Thaw depth, Thaw weakening, Frozen ground settling, Highway planning, China—Qinghai-Xizang Plateau

51-2986

Ways of preservation of frozen state of the soil around the underground storages for agricultural products.

Kuz'min, G.P., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.38-40,317, With Chinese summary. 3 refs.

Soil freezing, Artificial freezing, Permafrost preservation, Underground storage, Cold storage

51-2987

Achievement and perspective of the study on preventive technics of frost damage to hydraulic structures in seasonally frozen soil region.

Zhou, Z., Xu, S.X., Xu, L.J., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.41-48,318, With Chinese summary. 5 refs.

Hydraulic structures, Soil freezing, Frost heave, Frost action, Frost protection, Soil stabilization

51-2988

Experience and perspectives of underground refrigerators building in the North.

Galkin, A.F., Kiselev, V.V., Sherstov, V.A., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.49-51, With Chinese title. 12 refs.

Soil freezing, Artificial freezing, Permafrost preservation, Underground storage, Cold storage, Russia—Yakutia

51-2989

Design of highway non-masonry foundation pipe culvert in permafrost region.

Yuan, X.Z., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.52-56,318, With Chinese summary. 2 refs.

Culverts, Drains, Frost protection, Thermal insulation, Geotextiles, Soil stabilization, Permafrost beneath roads, Permafrost preservation, Road maintenance, Subgrade maintenance, China—Greater Khingan Range

51-2990

Analysis of the operation of tanks exploited in the North.

Prokhorov, V.A., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.57-58,318, With Chinese summary.

Storage tanks, Steel structures, Oil storage, Permafrost beneath structures, Frozen ground settling, Settlement (structural), Cold stress, Brittleness, Cracking (fracturing), Accidents, Oil spills

51-2991

Frost heave susceptibility of highway subgrade soils in seasonal frost regions.

Wang, X.L., Dai, H.M., Gao, W., Chen, X.B., Wang, Y.Q., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.59-66,318, With Chinese summary. 3 refs.

Subgrade soils, Frozen ground strength, Soil strength, Frost heave, Frost resistance, Soil tests, Environmental tests, Subgrade maintenance, Road maintenance, China

51-2992

Frozen injury damage of retaining wall and hydraulic power heaving force acting on retaining wall.

Guan, F.N., Liu, Z.M., Zhu, Y.F., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.67-73,318, With Chinese summary.

Walls, Earth fills, Soil freezing, Frost penetration, Frost action, Frost resistance, Frost heave, Soil pressure

51-2993

Artificial regulation of the temperature regime of frozen base.

Alekseeva, O.I., Demchenko, R.IA., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.74-76,318-319, With Chinese summary. 4 refs.

Foundations, Subgrade soils, Soil stabilization, Soil freezing, Artificial freezing, Permafrost beneath structures, Permafrost preservation, Thermal insulation

51-2994

Influence of sun-precipitation protective sheds on the thermal regime of roadbed base on permafrost.

Liu, J.K., Kondrat'ev, V.G., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.77-80,319, With Chinese summary. 9 refs.

Railroads, Roadbeds, Embankments, Permafrost beneath roads, Permafrost preservation, Solar radiation, Shelters

51-2995

Features of electric design for multi-storey building in cold region of China.

Li, J.Y., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.81-83,319, With Chinese summary.

Buildings, Electric power, Utilities, Cold weather construction

51-2996

Case study of architectural frost damages.

Guo, M.Z., Yang, D.A., Yu, G.R., Guan, M.C., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.84-86,319, With Chinese summary.

Industrial buildings, Foundations, Subgrade soils, Frost action, Frost heave, Settlement (structural), Soil stabilization, Frost protection, Cold weather construction

51-2997

Destruction in winter of plain reservoir revet in frost area and the preventive measures.

Sun, J.M., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.87-90,319, With Chinese summary.

Reservoirs, Embankments, Ice push, Bank protection (waterways), Frost heave, Frost action, Frost protection, Soil stabilization, Cold weather construction, China—Heilongjiang Province

51-2998

New energy-saving arched roof board.

Zhu, S.L., Qi, X.Z., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.91-93,319, With Chinese summary.

Industrial buildings, Roofs, Concrete structures, Concrete placing, Thermal insulation, Waterproofing, Cold weather construction

51-2999
Analysis to frost damages of gardens buildings in cold regions.
Wang, L.B., Ma, Y.T., Han, H.G., Zhu, L., Guan, M.C., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.94-97,319, With Chinese summary.
Frost action, Frost heave, Urban planning, Human factors engineering, Cold weather construction

51-3000
Prediction method for highway icing.
Wang, X.L., Dai, H.M., Yang, M., Gao, W., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.98-100,319, With Chinese summary. 6 refs.
Road icing, Naleds, Ice forecasting, Highway planning, Road maintenance

51-3001
On the lime-flyash stabilized crushed stone used as a base course in cold regions.
Sha, Y.B., Hong, Z.X., Wang, Z.T., Liu, H.M., Jiao, G.B., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.101-106,320, With Chinese summary.
Streets, Subgrade soils, Liming, Soil cement, Frost protection, Soil stabilization, Freeze thaw tests, Subgrade maintenance, Road maintenance, China—Harbin

51-3002
Coupled problem of unsteady seepage of water and thermal transfer in roadbed on permafrost.
Liu, J.K., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.107-110,320, With Chinese summary. 7 refs.
Roadbeds, Subgrade soils, Permafrost beneath roads, Permafrost heat transfer, Permafrost hydrology, Seepage, Ground thawing, Thaw depth, Mathematical models

51-3003
Road destruction and prevention of heat-supply pipeline.
Li, Z.Y., Shi, B.X., Chen, B.Y., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.111-116,320, With Chinese summary.
Permafrost beneath roads, Permafrost preservation, Thaw weakening, Frozen ground settling, Soil stabilization, Heat pipes, Underground pipelines, Frost protection, Road maintenance

51-3004
Foundation stability of low buildings on detrimentally frozen grounds of southern Zaibaikale.
Sal'nikov, P.I., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.117-119,320, With Chinese summary. 3 refs.
Buildings, Foundations, Subgrade soils, Frozen ground strength, Frozen ground settling, Frost heave, Frost protection, Soil stabilization, Russia—Transbaikal

51-3005
Influence of frost and thaw cycles on stability of lime soil beneath subgrade.
Xu, X.Z., et al, International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.120-122,320, With Chinese summary. 3 refs.
Subgrade soils, Frozen ground strength, Frost resistance, Frost protection, Soil stabilization, Liming, Soil tests, Freeze thaw tests

51-3006
Modeling of the process of ground freezing with regard to moisture migration and heaving.
Chistotinov, L.V., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.123-126,320, With Chinese summary. 5 refs.
Soil freezing, Freezing front, Soil water migration, Frost heave, Frozen ground thermodynamics, Permafrost heat transfer, Mathematical models, Computerized simulation

51-3007
Effects of grain composition of seasonally frozen soil on soil property.
Sun, T.W., Chen, Y., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.127-128,320, With Chinese summary.
Soil structure, Grain size, Unfrozen water content, Frost heave, Frozen ground strength, Frozen ground settling

51-3008
Prognosis of technical effectiveness of foundation forming a frozen base.
Gur'ianov, I.E., Votiakova, N.I., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.129-132,321, With Chinese summary. 7 refs.
Mine shafts, Foundations, Frozen ground strength, Permafrost beneath structures, Permafrost heat transfer, Permafrost preservation, Taliks, Artificial freezing, Soil stabilization

51-3009
Perpendicularly anisotropic properties on elastic coefficients of frozen soil.
Zhang, C.Q., Zhang, J.M., Peng, W.W., Yu, Z.Q., Sha, J.D., Jiang, Y.J., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.133-135,321, With Chinese summary. 7 refs.
Loess, Soil structure, Microstructure, Soil freezing, Artificial freezing, Frozen ground strength, Soil creep

51-3010
Strength of frozen soils under loading and unloading.
Gur'ianov, I.E., Ma, W., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.136-138,321, With Chinese summary. 3 refs.
Frozen ground strength, Frozen ground compression, Soil tests, Strain tests, Ultimate strength, Relaxation (mechanics)

51-3011
Two effective measures to prevent tangential frost heaving force.
Liu, H.X., Feng, C., Zhou, H., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.139-144,321, With Chinese summary. 4 refs.
Soil freezing, Frost heave, Frost protection, Frozen ground strength, Frozen ground compression, Foundations, Soil stabilization

51-3012
Valuation a deposit of thawing large detrital rocks with various types of cryogenic textures.
Shesternev, D.M., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.145-150,321, With Chinese summary. 13 refs.
Frozen rocks, Frost weathering, Frost shattering, Ground thawing, Cryogenic soils, Soil formation, Soil structure, Grain size

51-3013
Geometric analysis on the creep of frozen soil under increasing stress using creep theories.
Sheng, Y., Wu, Z.W., Zhu, Y.L., Ma, W., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.151-154,321-322, With Chinese summary. 4 refs.
Frozen ground strength, Soil creep, Stress strain diagrams

51-3014
Regularities of operating and principles of calculation the convective thermosiphons.
Konovalov, A.A., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.155-157,322, With Chinese summary. 6 refs.
Permafrost beneath structures, Permafrost preservation, Permafrost heat transfer, Soil freezing, Artificial freezing, Frozen ground strength, Heat pipes

51-3015
Discussion on the appraising principle and the managing idea on the foundation of construction in the zone of frozen earth for many years of Muo He County in the Da Xing An region in northeastern China.
Lin, F.T., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.158-163,322, With Chinese summary. 3 refs.
Forest fires, Accidents, Land reclamation, Buildings, Foundations, Subgrade soils, Soil stabilization, Continuous permafrost, Permafrost beneath structures, Permafrost preservation, China—Greater Khingan Range

51-3016
Displacement of shallow foundations by the effect of frost heaving forces.
Musorin, A.V., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.164-166,322, With Chinese summary. 9 refs.
Foundations, Subgrade soils, Soil freezing, Frost heave, Frost protection, Soil stabilization, Frozen ground strength, Frozen ground compression, Frozen ground settling

51-3017
Dynamic elastic modulus of frozen soil and critical dynamic stress on circulating load.
Xu, X.Y., Liu, H.X., Ding, J.K., Zhong, C.L., Liu, L.D., Zhang, J.Y., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.167-169,322, With Chinese summary.
Frozen ground strength, Soil tests, Strain tests, Stress strain diagrams

51-3018
Methods and results of experimental research into negative friction forces acting on piles in thawing soils.
Torgashev, V.V., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.170-173,322-323, With Chinese summary. 2 refs.
Frozen ground strength, Frozen ground settling, Ground thawing, Pile load tests

51-3019
Study on frost heaving intermittence force of clay soil.
Xu, L.J., Xu, S.X., Yu, B.F., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.174-179,323, With Chinese summary. 5 refs.
Clay soils, Subgrade soils, Soil freezing, Frost heave, Frost resistance, Frozen ground strength, Frozen ground compression

51-3020

Firmness of freezing soils and ice with plastics.
Gaĭdaenko, E.I., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.180-181,323, With Chinese summary. 8 refs.
Frozen ground strength, Ground ice, Ice adhesion, Plastics ice friction, Pipes (tubes)

51-3021

Effect of confining pressure on strength behaviour of frozen soil.
Ma, W., Wu, Z.W., Sheng, Y., Chang, X.X., Zhang, J.Y., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.182-185,323, With Chinese summary. 8 refs.
Frozen ground strength, Frozen ground compression, Regelation, Thaw weakening, Soil creep, Soil tests, Strain tests

51-3022

Calculation of thermophysical properties of large-fragmented rocks at the non-uniform composition of gruss-crushed stone and gravel-pebble inclusions.
Gavril'ev, R.I., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.186-189,323, With Chinese summary. 10 refs.
Gravel, Earth fills, Subgrade soils, Soil structure, Frozen ground thermodynamics, Thermal conductivity, Grain size, Particle size distribution, Mathematical models

51-3023

Study on frost heaving characteristics of foundation with fly ash.
Wang, G.S., Li, K., Wang, X.S., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.190-193,323, With Chinese summary.
Foundations, Subgrade soils, Frost penetration, Frost heave, Frost resistance, Frost protection, Soil stabilization

51-3024

Consolidation of fly ash foundation with heavy tamping method.
Xu, G.G., Wang, G.S., Li, K., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.194-196,323-324, With Chinese summary.
Foundations, Subgrade soils, Soil stabilization, Soil compaction, Frozen ground strength, Soil tests, Freeze thaw tests

51-3025

Impact test on frozen silt with different impulse and water content.
Yu, Q.H., Zhu, Y.L., He, P., Zhang, J.M., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.197-202,324, With Chinese summary. 6 refs.
Loess, Frozen ground strength, Soil water, Unfrozen water content, Soil strength, Soil tests, Impact tests

51-3026

Experimental study on frost heaving of fly ash in laboratory.
Li, K., Wang, G.S., Gong, Z.Q., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.203-206,324, With Chinese summary.
Foundations, Subgrade soils, Frost heave, Frost resistance, Frost protection, Liming, Soil stabilization, Environmental tests

51-3027

Analysis of correlative factors of frost heaving amount of frozen soil in seasonally frozen area of Heilongjiang Province.
Wang, X.R., Li, H.R., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.207-210,324, With Chinese summary. 2 refs. For another version see 51-1428.
Soil freezing, Frost resistance, Frost heave, Frost penetration, Statistical analysis, China—Heilongjiang Province

51-3028

Particle content and frost-heave of cohesive soil.
Han, H.G., Guo, M.Z., Yu, G.R., Yang, D.A., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.211-212,324, With Chinese summary. 2 refs.
Soil structure, Soil freezing, Frost heave, Frost resistance, Grain size, Particle size distribution

51-3029

Foundation displacement and the relaxation of frost heaving force.
Fang, L.R., Sun, X.B., Liu, H.X., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.213-215,324, With Chinese summary. 2 refs.
Foundations, Subgrade soils, Soil freezing, Frost heave, Frozen ground strength, Frozen ground compression, Soil creep, Relaxation (mechanics)

51-3030

Feasibility of shallow footing in remolding of old cities in cold region.
Guo, X., Song, L., Xu, W.X., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.216-217,324, With Chinese summary.
Buildings, Foundations, Subgrade soils, Earth fills, Soil stabilization, Frost protection, Urban planning, Cold weather construction

51-3031

Thermodynamic characteristics of typical soil during freezing and thawing cycles in Daqing area.
Sun, W.M., Li, S.L., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.218-221,325, With Chinese summary. 2 refs.
Soil freezing, Ground thawing, Frozen ground thermodynamics, Frozen ground temperature, Thermal conductivity, Unfrozen water content, Soil tests, Freeze thaw tests, China—Heilongjiang Province

51-3032

View on frost heave resistance of a pile cap in seasonal frost soil areas.
Jia, D.X., Feng, Y.L., Gao, A.D., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.222-224,325, With Chinese summary. 4 refs.
Buildings, Foundations, Piles, Soil freezing, Frozen ground strength, Frost heave, Frost resistance, Frost protection, Soil stabilization, Cold weather construction

51-3033

New technology of erecting monolithic structures in cold regions.
Sergeev, K.I., Krylov, B.A., Shvyriaev, IA.M., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.225-227,325, With Chinese summary. 3 refs.
Concrete structures, Concrete slabs, Reinforced concretes, Concrete placing, Winter concreting, Concrete heating, Concrete strength, Concrete durability, Cold weather construction, Russia

51-3034

Experiment and application of combining the dewatering and early-strength admixture with cement grout by using high-pressure grouting pile in cold region.

Ao, L.Z., Yang, Y.J., Zhang, Y.Q., Ma, T.J., Li, S.M., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.228-232,325, With Chinese summary. 1 ref.

Concrete piles, Concrete strength, Concrete placing, Winter concreting, Concrete admixtures, Cement admixtures, Grouting, Cold weather construction

51-3035

Rise of concrete durability in monolithic extended structures in cold regions.

Sergeev, K.I., Sergeeva, Ts.B., Krylov, B.A., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.233-234,325, With Chinese summary. 4 refs.

Concrete structures, Concrete slabs, Reinforced concretes, Concrete placing, Winter concreting, Concrete heating, Concrete strength, Concrete durability, Cold weather construction

51-3036

Applying geotechnical fabric to prevent and cure road frost boiling.

Jiang, H.J., Cao, J.A., Liu, L.F., Teng, X.Z., Qu, C.B., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.235-238,325, With Chinese summary. 3 refs.

Subgrade soils, Frost heave, Frost protection, Thaw weakening, Soil stabilization, Geotextiles, Drainage, Waterproofing, Road maintenance, Cost analysis, China—Heilongjiang Province

51-3037

"Dry" technology of installation of piles in permafrost soils and prospect of its practical use.

Kovalevskiĭ, A.A., Fedorov, V.I., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.239-241,325-326, With Chinese summary.

Permafrost beneath structures, Drilling, Pile driving, Russia—Yakutsk

51-3038

Science and technology of concrete at minus-temperature in China.

Zhu, W.Z., Zeng, S.X., Zhao, Y.L., Tian, Z.F., Niu, C.R., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.242-244,326, With Chinese summary. 4 refs.

Concrete freezing, Winter concreting, Concrete admixtures, Frost protection, Antifreezes, China

51-3039

Experimental installations for determination of thermal physical properties of frozen soil in Zabaikaliy.

Imetkhenov, A.B., Dambiev, Ts.Ts., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.245-246,326, With Chinese title.

Frozen ground thermodynamics, Permafrost heat transfer, Permafrost thermal properties, Thermal conductivity, Probes, Russia—Transbaikal

51-3040

On thermos-cooling theory of concrete with antifreezing admixture for winter concreting construction.

Zhu, W.Z., Zeng, S.X., Yin, D.M., Zhao, Y.L., Niu, C.R., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.247-250,326, With Chinese summary. 3 refs.

Winter concreting, Concrete hardening, Concrete admixtures, Frost protection, Antifreezes, Cooling rate, Thermal analysis, Mathematical models

51-3041

Research on acceptance condition about early-age strength of concrete at minus-temperature in cold weather concreting engineering.

Zhu, W.Z., Guan, M.C., Zeng, S.X., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.251-254,326, With Chinese summary. 3 refs.

Concrete freezing, Winter concreting, Concrete strength, Concrete admixtures, Frost protection, Frost resistance, Antifreezes, Cold weather tests

51-3042

Application of low-temperature early strength agent for concrete in winter construction of bridges.

Wang, R.B., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.255-257,326, With Chinese summary.

Bridges, Winter concreting, Concrete strength, Concrete admixtures, Frost protection

51-3043

Exploration in improving decorating coating's storage and cold-resistant performance.

Qu, Z.B., Wang, R.B., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.258-261,326, With Chinese summary. 7 refs.

Protective coatings, Antifreezes, Weatherproofing, Cold weather performance

51-3044

Effects of concrete anti-freezing agent on frost heave deformation of cement mortar.

Zhang, J.X., Yang, J., Ding, X.T., Zhang, Y., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.262-264,326-327, With Chinese summary.

Concrete freezing, Concrete strength, Concrete admixtures, Frost heave, Frost action, Frost resistance, Frost protection, Antifreezes

51-3045

Research on the interface microstructure and mechanical properties of minus temperature concrete with antifreeze.

Ba, H.J., Yang, Y.Z., He, Z.M., Liu, X.B., You, Z.J., Xia, Y., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.265-269,327, With Chinese summary. 4 refs.

Concrete freezing, Concrete strength, Concrete admixtures, Frost resistance, Antifreezes, Microstructure

51-3046

Making-up principle of high-strength pumping concrete at minus-temperature for engineering in cold region.

Yao, J.Y., Zeng, S.X., Zhu, W.Z., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.270-273,327, With Chinese summary. 9 refs.

Winter concreting, Concrete placing, Concrete admixtures, Concrete strength, Frost protection, Antifreezes

51-3047

Application of insulation with polystyrene foam plate in foundation in tank areas.

Geng, B., Wei, Y.F., Zhu, L., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.274-277,327, With Chinese summary.

Storage tanks, Oil storage, Foundations, Subgrade soils, Soil stabilization, Frost protection, Thermal insulation, Cellular plastics

51-3048

Application of leakage-stopping technique to negative temperature concrete by using epoxy resin.

Li, Y.M., Hao, M., Qu, Z.B., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.278-279,327, With Chinese summary. 3 refs.

Storage tanks, Concrete structures, Concrete freezing, Frost action, Leakage, Sealing, Waterproofing, Resins, Cold weather performance

51-3049

Heavy tamped foundations and shallow footing—an experience from the energy saving dwelling constructions in Jiamusi Heat and Power Plant.

Guo, X., Zhao, G.Q., Shi, D.B., Wu, C.F., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.280-281,327, With Chinese summary.

Residential buildings, Foundations, Subgrade soils, Earth fills, Soil stabilization, Soil compaction, Frost protection, Cold weather construction, China—Heilongjiang Province

51-3050

Problems of engineering and ecological support of gas-oil field facility construction in Yakutia.

Konstantinov, I.P., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.282-283,327, With Chinese summary. 3 refs.

Petroleum industry, Permafrost beneath structures, Permafrost preservation, Cold weather construction, Environmental impact, Environmental protection, Russia—Yakutia

51-3051

Affect of gold mining on frost environment—a case of the northeast area in China.

Wang, C.H., Song, C.C., Liu, F.T., Zhang, B.L., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.284-286,328, With Chinese summary. 2 refs.

Gold, Placer mining, Environmental impact, Permafrost preservation, Soil erosion, Soil conservation, Land reclamation, China

51-3052

Special features of open pit influence on frozen grounds in central Yakutia given an ice complex.

Gavril'ev, P.P., Argunov, R.N., Efremov, P.V., Ugarov, I.S., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.287-289,328, With Chinese summary.

Pits (excavations), Permafrost preservation, Permafrost weathering, Frost weathering, Ground ice, Ground thawing, Frozen ground settling, Thermokarst, Soil erosion, Russia—Yakutia

51-3053

Impacts of the disastrous forest fire on the ecological environment in the Great Xingan mountainous area in northeastern China.

Yin, Y.H., Chen, Y.M., Liang, L.H., Zhang, D.J., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.290-299,328, With Chinese summary. 8 refs.

Forest fires, Accidents, Environmental impact, Permafrost distribution, Permafrost preservation, Revegetation, Soil erosion, Land reclamation, China—Greater Khingan Range

51-3054

Some problems of engineering geochemistry in cryolithozone.

Makarov, V.N., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.300-301,328, With Chinese summary. 11 refs.

Frozen ground strength, Frozen ground chemistry, Geochemistry, Soil stabilization, Engineering geology

51-3055

Recent changes of permafrost along the Qinghai-Xizang (Tibet) Highway.

Wang, G.S., Jin, H.J., Lin, Q., He, P., Cheng, G.D., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.302-305,328, With Chinese summary. 36 refs.

Permafrost beneath roads, Permafrost distribution, Permafrost depth, Permafrost preservation, Permafrost forecasting, Ground thawing, Global warming, China—Qinghai-Xizang Plateau

51-3056

Measurement of roof snow depths by kite balloon aerial photogrammetry.

Joh, O., Sakurai, S., Shibata, T., International Symposium on Cold Regions Engineering, Harbin, China, Sep. 11-14, 1996. Proceedings, Harbin, China, University of Harbin Industry Technology Press, 1996, p.308-313,328, With Chinese summary. 3 refs.

Roofs, Snow depth, Snow loads, Photogrammetry, Balloons

51-3057

Near-real-time sea ice monitoring in the Northern Sea Route using ERS-1 SAR and DMSP SSM/I microwave data.

Johannessen, O.M., et al, *Acta Astronautica,* Feb.-Apr. 1996, 38(4-8), Benefits of Space for Humanity. International Astronautical Federation Congress, 46th, Oslo, Norway, Oct. 2-6, 1995. Selected proceedings, p.457-465, 12 refs.

Sea ice, Synthetic aperture radar, Microwaves, Monitors, Ice conditions, Spacecraft, Ice navigation, Data processing, Mapping, Northern Sea Route, Russia—Kara Sea

51-3058

Influence of convection on the microstructure of fibrous eutectics.

Wilcox, W.R., Regel, L.L., *Acta Astronautica,* Feb.-Apr. 1996, 38(4-8), Benefits of Space for Humanity. International Astronautical Federation Congress, 46th, Oslo, Norway, Oct. 2-6, 1995. Selected proceedings, p.511-516, 69 refs.

Microstructure, Freezing rate, Supercooling, Convection, Solidification

51-3059

Minimum design loads for buildings and other structures.

American Society of Civil Engineers, *ASCE standard,* June 6, 1996, ANSI/ASCE 7-95, 214p., Refs. passim. Revision of ANSI/ASCE 7-93.

Standards, Loads (forces), Snow loads, Static loads, Dynamic loads, Earthquakes, Wind factors, Design criteria, Structures, Buildings, Foundations, Ice loads, Icing, Roofs

51-3060

Effects of melting on frontogenesis.

Szeto, K.K., Stewart, R.E., *Journal of atmospheric sciences,* Mar. 15, 1997, 54(6), p.689-702, 37 refs.

Precipitation (meteorology), Fronts (meteorology), Cloud physics, Snow melting, Snow air interface, Cooling, Turbulent boundary layer, Turbulent diffusion, Shear flow, Mathematical models, Thermal analysis, Simulation

51-3061

Test of the equation of state of water up to freezing at 100 and 200 C.

Grimsditch, M., Popova, S., Polian, A., *Journal of chemical physics,* Nov. 15, 1996, 105(19), p.8801-8803, 20 refs.

Water structure, Thermodynamic properties, Temperature effects, High pressure tests, Freezing points, Solidification, Mathematical models, Spectroscopy, Light scattering, Density (mass/volume), Refractivity, Statistical analysis

51-3062

Isolation of mutations affecting the development of freezing tolerance in *Arabidopsis thaliana* (L.) Heynh.

Warren, G., McKown, R., Marin, A., Teutonico, R., *Plant physiology,* Aug. 1996, 111(4), p.1011-1019, 27 refs.

Plant physiology, Cold tolerance, Acclimatization, Plant tissues, Modification, Cold weather tests, Classifications, Damage, Correlation

51-3063

Structural studies of hydrogen, oxygen and ice at very high pressures.

Häusermann, D., *Physica scripta,* 1996, Vol.T66, General Conference of the Condensed Matter Division of the European Physical Society, 15th, Baveno-Stresa, Italy, Apr. 22-25, 1996. Proceedings, p.102-106, 17 refs.

Ice physics, Ice structure, High pressure tests, High pressure ice, Spectroscopy, Spectra, X ray diffraction, Stresses, Phase transformations

51-3064

Laboratory studies of angle- and polarization-dependent light scattering in sea ice.

Miller, D., Quinby-Hunt, M.S., Hunt, A.J., *Applied optics,* Feb. 20, 1997, 36(6), p.1279-1288, 29 refs.

Oceanography, Sea ice, Remote sensing, Light scattering, Ice optics, Radiance, Sampling, Polarization (waves), Ice structure, Orientation, Ice models, Ice air interface, Simulation

51-3065

One-phase supercooled Stefan problem with a convective boundary condition.

Tarzia, D.A., Turner, C.V., *Quarterly of applied mathematics,* Mar. 1997, 55(1), p.41-50, 6 refs.

Liquid cooling, Supercooling, Stefan problem, Mathematical models, Phase transformations, Boundary value problems, Convection, Heat transfer coefficient, Liquid solid interfaces

51-3066

Epiphytic lichen biomass in managed and old-growth boreal forests: effect of branch quality.

Esseen, P.A., Renhorn, K.E., Pettersson, R.B., *Ecological applications,* Feb. 1996, 6(1), p.228-238, 58 refs.

Forestry, Forest ecosystems, Biomass, Lichens, Classifications, Forest canopy, Sampling, Growth, Vegetation factors, Nutrient cycle, Environmental protection

51-3067

Response of xylem ray parenchyma cells of red osier dogwood (*Cornus sericea* L.) to field freezing stress, and to freeze-thaw cycle.

Ristic, Z., Ashworth, E.N., *Journal of plant physiology,* Nov. 1996, 149(6), p.735-745, 37 refs.

Trees (plants), Plant tissues, Cryobiology, Freeze thaw tests, Thermal stresses, Frost resistance, Cold weather tests, Cold weather survival, Electron microscopy, Laboratory techniques

51-3068

Freezing and heat tolerance of *Opuntia* cacti native to the Canadian prairie provinces.

Ishikawa, M., Gusta, L.V., *Canadian journal of botany,* Dec. 1996, 74(12), p.1890-1895, With French summary. 25 refs.

Plant ecology, Acclimatization, Plant tissues, Growth, Heating, Frost resistance, Water content, Simulation, Seasonal variations, Environmental tests

51-3069

Thermal conductivity of solid methane.

Jeżowski, A., Misiorek, H., Sumarokov, V.V., Gorodilov, B.IA., *Physical review B,* Mar. 1, 1997, 55(9), p.5578-5580, 36 refs.

Hydrocarbons, Natural gas, Cryogenics, Solidification, Thermal properties, Thermal conductivity, Low temperature research, Thermodynamic properties, Crystal growth, Molecular energy levels

51-3070

Cold hardening and slow cooling: tools for successful cryopreservation and recovery of in vitro shoot tips of silver birch.

Ryynänen, L., *Canadian journal of forest research,* Nov. 1996, 26(11), p.2015-2022, With French summary. 31 refs.

Forestry, Cryobiology, Trees (plants), Cold storage, Antifreezes, Plant tissues, Damage, Countermeasures, Acclimatization, Cold tolerance, Growth, Revegetation, Statistical analysis

51-3071

Early summer temperatures since 1670 A.D. for central Kamchatka reconstructed based on a Siberian larch tree-ring width chronology.

Gostev, M., Wiles, G., D'Arrigo, R., Jacoby, G., Khomentovskiĭ, P.A., *Canadian journal of forest research,* Nov. 1996, 26(11), p.2048-2052, With French summary. 17 refs.

Climatology, Air temperature, Trees (plants), Growth, Age determination, Correlation, Seasonal variations, Sampling, Statistical analysis, Russia—Kamchatka Peninsula

51-3072

Microwave radiometric technique to retrieve vapor, liquid and ice, part I—development of a neural network-based inversion method.

Li, L., Vivekanandan, J., Chan, C.H., Tsang, L., *IEEE transactions on geoscience and remote sensing,* Mar. 1997, 35(2), p.224-236, 31 refs.

Climatology, Atmospheric composition, Radiometry, Cloud physics, Supercooled clouds, Water vapor, Ice optics, Scattering, Brightness, Radiation balance, Radiation absorption, Mathematical models, Statistical analysis

51-3073

Microwave radiometric technique to retrieve vapor, liquid and ice: part II—joint studies of radiometer and radar in winter clouds.

Vivekanandan, J., Li, L., Tsang, L., Chan, C., *IEEE transactions on geoscience and remote sensing,* Mar. 1997, 35(2), p.237-247, 28 refs.

Climatology, Cloud physics, Ice detection, Particle size distribution, Water vapor, Radiometry, Radio echo soundings, Radiation balance, Scattering, Statistical analysis, Correlation

51-3074

Classification of particles in stratiform clouds using the 33 and 95 GHz polarimetric cloud profiling radar system (CPRS).

Lohmeier, S.P., Sekelsky, S.M., Firda, J.M., Sadowy, G.A., McIntosh, R.E., *IEEE transactions on geoscience and remote sensing,* Mar. 1997, 35(2), p.256-270, 48 refs.

Clouds (meteorology), Cloud physics, Meteorological instruments, Ice crystals, Ice detection, Radio echo soundings, Polarization (waves), Attenuation, Profiles, Statistical analysis, Portable equipment, Classifications

51-3075

Fuzzy contextural classification of multisource remote sensing images.

Binaghi, E., Madella, P., Montesano, M.G., Rampini, A., *IEEE transactions on geoscience and remote sensing,* Mar. 1997, 35(2), p.326-340, 53 refs.

Remote sensing, Alpine glaciation, Spaceborne photography, Classifications, Statistical analysis, Image processing, Mountain glaciers, Glacier surveys, Ice detection, Ice edge, Snow line, Correlation

51-3076

Interpretation of SSM/I measurements over Greenland.

Grody, N.C., Basist, A.N., *IEEE transactions on geoscience and remote sensing,* Mar. 1997, 35(2), p.360-366, 18 refs.

Ice sheets, Glacier surveys, Snow surveys, Radiometry, Snow optics, Scattering, Snow cover effect, Metamorphism (snow), Snowmelt, Attenuation, Greenland

51-3077

Influence of land-cover category on brightness temperature of snow.

Kurvonen, L., Hallikainen, M., *IEEE transactions on geoscience and remote sensing,* Mar. 1997, 35(2), p.367-377, 13 refs.

Snow surveys, Snow cover distribution, Aerial surveys, Helicopters, Radiometry, Snow cover structure, Snow cover effect, Brightness, Snow surface temperature, Forest canopy, Vegetation factors, Landscape types, Statistical analysis

51-3078

Microwave backscattering model for deformed first-year sea ice and comparisons with SAR data.

Carlström, A., *IEEE transactions on geoscience and remote sensing,* Mar. 1997, 35(2), p.378-391, 34 refs.

Remote sensing, Sea ice, Ice surveys, Synthetic aperture radar, Backscattering, Pressure ridges, Ice models, Mathematical models, Ice dielectrics, Polarization (waves), Topographic effects, Orientation, Ice edge

51-3079

Development of a simulated data set for the SeaWiFS mission.

Gregg, W.W., Patt, F.S., Woodward, R.H., *IEEE transactions on geoscience and remote sensing,* Mar. 1997, 35(2), p.421-435, 21 refs.

Remote sensing, Oceanographic surveys, Spaceborne photography, Sensors, Simulation, Sea ice, Ice detection, Correlation, Statistical analysis, Data processing, Image processing

51-3080

Reflection profiling of arctic lake ice using microwave FM-CW radar.

Arcone, S.A., Yankielun, N.E., Chacho, E.F., Jr., MP 4006, *IEEE transactions on geoscience and remote sensing,* Mar. 1997, 35(2), p.436-443, 24 refs.

Icebound lakes, Ice surveys, Lake ice, Ice cover thickness, Profiles, Radio echo soundings, Reflectivity, Grounded ice, Antennas, Airborne radar, Ice water interface, Ice solid interface, Scattering

X- and C-band FM-CW radar reflection profiles were obtained across frozen lakes in northern Alaska using a single elevated high-gain antenna. Clear returns were obtained from the air/snow, snow/ice, ice/water, and ice/ground interfaces. Surface-to-bottom signal intensity ratios are within ranges predicted by plane wave reflection theory, use of which also gives plausible permittivity values for the ice-rich bottom silts. Scattering losses are interpreted for the X-band ice-bottom signals, but evidence of increased volumetric scattering loss with increasing ice thickness may have been masked by changes in bottom dielectric contrasts. The results suggest that this type of radar is superior to conventional GPR systems for this application and ice grounded to almost any type of bottom sediments could be profiled from an airborne platform. (Auth. mod.)

51-3081

Design and performance of a spinning flat reflector for millimeter-wave radiometry.

Jacobson, M.D., Nunnelee, W.M., *IEEE transactions on geoscience and remote sensing,* Mar. 1997, 35(2), p.464-466, 7 refs.

Meteorological instruments, Water vapor, Cloud physics, Sensors, Radiometry, Brightness, Design, Ice cover effect, Ice removal, Snow removal, Mechanical properties, Simulation, Cold weather performance

51-3082

^{15}N natural abundances and N use by tundra plants.

Nadelhoffer, K., Shaver, G., Fry, B., Giblin, A., Johnson, L., McKane, R., *Oecologia,* Aug. 1996, 107(3), p.386-394, 46 refs.

Plant ecology, Ecosystems, Tundra vegetation, Nutrient cycle, Tundra soils, Isotope analysis, Decomposition

51-3083

Hydrocarbon radiation chemistry in ices of cometary relevance.

Hudson, R.L., Moore, M.H., *Icarus,* Mar. 1997, 126(1), p.233-235, 18 refs.

Extraterrestrial ice, Ice physics, Ice composition, Hydrocarbons, Radiation absorption, Geochemistry, Simulation, Photochemical reactions, Gamma irradiation, Molecular structure

51-3084

Model of transient changes in arctic and boreal vegetation in response to climate and land use change.

Starfield, A.M., Chapin, F.S., III, *Ecological applications,* Aug. 1996, 6(3), p.842-864, Refs. p.859-863.

Climatic changes, Global warming, Plant ecology, Forest ecosystems, Forest fires, Tundra vegetation, Tundra terrain, Classifications, Revegetation, Vegetation patterns, Forest lines, Models

51-3085

North Polar Basin as a component of the earth's cryosphere.

Danilov, I.D., *Water resources,* Jan.-Feb. 1997, 24(1), p.32-39, Translated from Vodnye resursy. 17 refs.

Geocryology, Oceanography, Reservoirs, Marine geology, Bottom sediment, Cryogenic soils, Subsea permafrost, Phase transformations, Ice cover effect, Sedimentation, Cooling, Lithology, Arctic Ocean

51-3086

Study of the Debye-Stokes-Einstein law in supercooled fluids.

Andreozzi, L., Di Schino, A., Giordano, M., Leporini, D., *Journal of physics—condensed matter,* Nov. 18, 1996, 8(47), p.9605-9608, 12 refs.

Liquid cooling, Supercooling, Hydrocarbons, Low temperature research, Viscosity, Diffusion, Molecular structure, Temperature effects, Electron paramagnetic resonance, Probes, Correlation

51-3087

Impact of the Younger Dryas cooling event upon lowland vegetation of maritime Canada.

Mayle, F.E., Cwynar, L.C., *Ecological monographs,* May 1995, 65(2), p.129-154, 53 refs.

Paleoecology, Climatic changes, Cooling, Tundra vegetation, Vegetation patterns, Lacustrine deposits, Drill core analysis, Palynology, Lithology, Stratigraphy, Classifications, Radioactive age determination, Canada—Nova Scotia, Canada—New Brunswick

51-3088

Ice hazes and clouds in the Martian atmosphere as derived from the Phobos/KRFM data.

Petrova, E., Keller, H.U., Markiewicz, W.J., Thomas, N., Wuttke, M.W., *Planetary and space science,* Oct. 1996, 44(10), p.1163-1176, 36 refs.

Mars (planet), Atmospheric composition, Cloud physics, Ice crystals, Ice sublimation, Haze, Dust, Condensation, Ultraviolet radiation, Brightness, Profiles, Spectra, Photometry

51-3089

Non-mycorrhizal uptake of amino acids by roots of the alpine sedge *Kobresia myosuroides*: implications for the alpine nitrogen cycle.

Raab, T.K., Lipson, D.A., Monson, R.K., *Oecologica,* Nov. 1996, 108(3), p.488-494, 25 refs.

Plant ecology, Alpine tundra, Tundra vegetation, Tundra soils, Nutrient cycle, Plant physiology, Roots, Meadow soils, Sampling, Simulation, Soil analysis, United States—Colorado—Front Range

51-3090

Intercomparison of snow sampling and analysis within the alpine-wide snowpack investigation (SNOSP).

Schwikowski, M., et al, *Water, air, and soil pollution,* Jan. 1997, 93(1-4), p.67-91, 26 refs.

Snow cover distribution, Alpine landscapes, Snow surveys, Atmospheric composition, Dust, Snow impurities, Sampling, Chemical analysis, Ion density (concentration), Environmental tests, Statistical analysis, Correlation, Accuracy, Alps

51-3091

Observing systems and data sets related to the cryosphere in Canada: a contribution to planning for the Global Climate Observing System.

Barry, R.G., *Atmosphere-ocean,* Dec. 1995, 33(4), p.771-807, With French summary. Refs. p.799-807.

Climatology, Research projects, Geocryology, Snow cover distribution, Sea ice distribution, Snow surveys, Ice surveys, Ground ice, Permafrost surveys, Ice cover effect, Geophysical surveys, Global change, Synoptic meteorology, Canada

51-3092

Frost susceptibility properties of Soma-B fly ash.

Çokça, E., *Journal of energy engineering,* Apr. 1997, 123(1), p.1-10, 10 refs.

Electric power, Waste disposal, Embankments, Earth fills, Frost resistance, Freeze thaw tests, Compaction, Subgrade soils, Soil cement, Cold weather tests, Compressive properties

51-3093

Spray irrigation effects on surface-layer stability in an experimental citrus orchard during winter freezes.

Cooper, H.J., Smith, E.A., Martsolf, J.D., *Journal of applied meteorology,* Feb. 1997, 36(2), p.155-166, 18 refs.

Agriculture, Frost protection, Surface temperature, Irrigation, Condensation, Air water interactions, Turbulent diffusion, Water vapor, Buoyancy, Temperature gradients, Cold weather tests, Mathematical models, Thermal diffusion

51-3094

Organic carbon dominated trichloroethene sorption in a clay-rich glacial deposit.

Allen-King, R.M., McKay, L.D., Trudell, M.R., *Ground water,* Jan.-Feb. 1997, 35(1), p.124-130, 53 refs.

Ground water, Water pollution, Hydrocarbons, Glacial deposits, Clay soils, Waste disposal, Environmental tests, Organic nuclei, Absorption, Mass balance, Geochemistry, Sampling

51-3095

Carbon and nutrient output from the Great Whale River (Hudson Bay) and a comparison with other rivers around Quebec.

Hudon, C., Morin, R., Bunch, J., Harland, R., *Canadian journal of fisheries and aquatic sciences,* July 1996, 53(7), p.1513-1525, With French summary. 54 refs.

Sedimentation, Sediment transport, River flow, Watersheds, Estuaries, Tundra terrain, Suspended sediments, Nutrient cycle, Ice breakup, Ice cover effect, Sampling, Seasonal variations, Hydrologic cycle, Hydrogeology, Statistical analysis, Seasonal variations, Canada—Quebec—Great Whale River

51-3096

Effects of phosphorus and allochthonous humic matter enrichment on the metabolic processes and community structure of plankton in a boreal lake (Lake Pääjärvi).

Arvola, L., Kankaala, P., Tulonen, T., Ojala, A., *Canadian journal of fisheries and aquatic sciences,* July 1996, 53(7), p.1646-1662, With French summary. Refs. p.1660-1662.

Microbiology, Limnology, Plankton, Bacteria, Ecosystems, Nutrient cycle, Sediment transport, Biomass, Sedimentation, Sampling, Geochemical cycles, Organic nuclei, Finland—Pääjärvi, Lake

51-3097

Carbon budget for the pelagic food web of the euphotic zone in a boreal lake (Lake Pääjärvi).

Kankaala, P., Arvola, L., Tulonen, T., Ojala, A., *Canadian journal of fisheries and aquatic sciences,* July 1996, 53(7), p.1663-1674, With French summary. Refs. p.1671-1674.

Limnology, Ecosystems, Biomass, Microbiology, Plankton, Nutrient cycle, Organic nuclei, Sedimentation, Leaching, Sampling, Solubility, Geochemical cycles, Finland—Pääjärvi, Lake

51-3098

Evaluation of an induced infiltration model as applied to glacial aquifer systems.

Conrad, L.P., Beljin, M.S., *Water resources bulletin,* Dec. 1996, 32(6), p.1209-1220, 38 refs.

Ground water, Hydrogeology, Water supply, Water table, Stream flow, Hydraulics, Water transport, Glacial deposits, Outwash, Seepage, Anisotropy, Wells, Forecasting, Mathematical models

51-3099

Motion of two-component soliton in a discrete inhomogeneous hydrogen-bonded chain.

Mefougue, R., Woafo, P., Kofane, T.C., *Physica scripta,* Nov. 1995, 52(5), p.481-487, 40 refs.

Latticed structures, Wave propagation, Ice physics, Hydrogen bonds, Defects, Impurities, Proton transport, Mathematical models, Vibration

51-3100

Combining snow and earthquake loads for limit states design.

Ellingwood, B., Rosowsky, D., *Journal of structural engineering,* Nov. 1996, 122(11), p.1364-1368, 19 refs.

Building codes, Standards, Design criteria, Snow loads, Earthquakes, Seismic velocity, Dynamic loads, Statistical analysis, Shear strength, Structural analysis, Mathematical models

51-3101

Spatial variability of radial growth in the forest-tundra ecotone of Rocky Mountain National Park, Colorado.

Hessl, A.E., Weisberg, P.J., Baker, W.L., *Torrey Botanical Club. Bulletin,* July-Sep. 1996, 123(3), p.206-212, 20 refs.

Forest ecosystems, Tundra vegetation, Tundra climate, Climatic changes, Trees (plants), Forest lines, Growth, Vegetation patterns, Alpine landscapes, Sampling, Statistical analysis, Classifications, United States—Colorado—Rocky Mountains

51-3103

Study of the growth rates and growth habits of ice crystals in a solution of antifreeze (glyco) proteins.

Li, Q.Z., Luo, L.F., *Chemical physics letters*, Dec. 20, 1996, 263(5), p.651-654, 21 refs.

Ice physics, Ice crystal growth, Ice crystal structure, Polymers, Antifreezes, Freezing rate, Supercooling, Adsorption, Ice water interface, Cryobiology, Thermodynamic properties, Temperature effects, Theories

51-3104

First-year freeze hardiness of pure species and hybrid taxa of *Pinus elliottii* (Engelman) and *Pinus caribaea* (Morelet).

Duncan, P.D., White, T.L., Hodge, G.R., *New forests*, Nov. 1996, 12(3), p.223-241, 24 refs.

Trees (plants), Frost resistance, Acclimatization, Cold weather tests, Cold weather survival, Damage, Temperature effects, Viability

51-3105

Frost hardiness, bud phenology and growth of containerized *Picea mariana* seedlings grown at three nitrogen levels and three temperature regimes.

Bigras, F.J., Gonzalez, A., D'Aoust, A.L., Hébert, C., *New forests*, Nov. 1996, 12(3), p.243-259, 31 refs.

Trees (plants), Phenology, Frost resistance, Growth, Nutrient cycle, Plant tissues, Acclimatization, Cold weather tests, Environmental tests, Revegetation, Simulation, Temperature effects

51-3106

Susceptibility of white spruce seedlings to overwinter injury and their post-injury responses.

Krasowski, M.J., Letchford, T., Caputa, A., Bergerud, W.A., Ott, P.K., *New forests*, Nov. 1996, 12(3), p.261-278, 21 refs.

Trees (plants), Plant physiology, Growth, Roots, Soil freezing, Freeze thaw cycles, Viability, Cold weather tests, Cold weather survival, Damage, Desiccation, Revegetation

51-3107

Line of compressibility maxima in the phase diagram of supercooled water.

Sciortino, F., Poole, P.H., Essmann, U., Stanley, H.E., *Physical review E*, Jan. 1997, 55(1), p.727-737, 81 refs.

Liquid cooling, Water structure, Supercooling, Phase transformations, Thermodynamic properties, Compressive properties, Low temperature research, Density (mass/volume), Amorphous ice, Computerized simulation, Correlation

51-3108

Theory of surface freezing of alkanes.

Tkachenko, A.V., Rabin, Y., *Physical review E*, Jan. 1997, 55(1), p.778-784, 17 refs.

Hydrocarbons, Frozen liquids, Phase transformations, Freezing, Thermodynamic properties, Molecular structure, Layers, Solid phases, Monomolecular films, Temperature effects, Surface energy, Mathematical models, Theories

51-3109

Sea-ice cover of the Arctic Ocean and the Eurasian marginal seas: a brief overview of present day patterns and variability.

Kolatschek, J., Eicken, H., Aleksandrov, V.IU., Kreyscher, M., *Berichte zur Polarforschung*, July 1996, No.212, Surface-sediment composition and sedimentary processes in the central Arctic Ocean and along the Eurasian Continental Margin. Edited by R. Stein, G.I. Ivanov, M.A. Levitan. and K. Fahl, p.2-18, 46 refs.

Sea ice distribution, Ice cover thickness, Drift, Arctic Ocean

51-3110

Arctic paleoceanography - Quo vadis.

Thiede, J., *Berichte zur Polarforschung*, July 1996, No.212, Surface-sediment composition and sedimentary processes in the central Arctic Ocean and along the Eurasian Continental Margin. Edited by R. Stein, G.I. Ivanov, M.A. Levitan, and K. Fahl, p.19-35, 48 refs.

Global change, Sea ice distribution, Glaciation, Marine biology, Marine geology, Paleoecology, Oceanography, Paleoclimatology, Arctic Ocean

51-3111

Terrigenous sediment supply into the Arctic Ocean: heavy-mineral distribution in the Laptev Sea.

Behrends, M., Peregovich, B., Stein, R., *Berichte zur Polarforschung*, July 1996, No.212, Surface-sediment composition and sedimentary processes in the central Arctic Ocean and along the Eurasian Continental Margin. Edited by R. Stein, G.I. Ivanov, M.A. Levitan, and K. Fahl, p.37-42, 8 refs.

Sediments, Sediment transport, Minerals, Alluvium, Marine deposits, Bottom sediment, Arctic Ocean, Russia—Laptev Sea, Russia—Severnaya Zemlya

51-3112

Clay minerals in surface sediments of the East Siberian and Laptev Seas.

Kalinenko, V.V., Shelekhova, E.S., Wahsner, M., *Berichte zur Polarforschung*, July 1996, No.212, Surface-sediment composition and sedimentary processes in the central Arctic Ocean and along the Eurasian Continental Margin. Edited by R. Stein, G.I. Ivanov, M.A. Levitan, and K. Fahl, p.43-50, 17 refs.

Alluvium, Clay minerals, Marine deposits, Bottom sediment, Arctic Ocean, Russia—East Siberian Sea, Russia—Laptev Sea

51-3113

Structure and lithological composition of Quaternary sediments of the Kara Sea.

Kosheleva, V.A., IAshin, D.S., *Berichte zur Polarforschung*, July 1996, No.212, Surface-sediment composition and sedimentary processes in the central Arctic Ocean and along the Eurasian Continental Margin. Edited by R. Stein, G.I. Ivanov, M.A. Levitan, and K. Fahl, p.51-57, 17 refs.

Lithology, Stratigraphy, Sediments, Quaternary deposits, Marine deposits, Bottom sediment, Arctic Ocean, Russia—Kara Sea

51-3114

Kara Sea: a reflection of modern environment in grain size, mineralogy, and chemical composition of the surface layer of bottom sediments.

Levitan, M.A., et al, *Berichte zur Polarforschung*, July 1996, No.212, Surface-sediment composition and sedimentary processes in the central Arctic Ocean and along the Eurasian Continental Margin. Edited by R. Stein, G.I. Ivanov, M.A. Levitan, and K. Fahl, p.58-80, 41 refs.

Environments, Bottom sediment, Chemical composition, Mineralogy, Marine deposits, Arctic Ocean, Russia—Kara Sea

51-3115

Distribution of magnetic susceptibility on the Eurasian shelf and continental slope—implications for source areas of magnetic minerals.

Niessen, F., Weiel, D., *Berichte zur Polarforschung*, July 1996, No.212, Surface-sediment composition and sedimentary processes in the central Arctic Ocean and along the Eurasian Continental Margin. Edited by R. Stein, G.I. Ivanov, M.A. Levitan, and K. Fahl, p.81-88, 8 refs.

Minerals, Geomagnetism, Magnetic properties, Volcanoes, Arctic Ocean, Russia—Kara Sea, Russia—Laptev Sea

51-3116

Main features of modern sediments in the southern part of the East Siberian Sea.

Nikiforov, S.L., *Berichte zur Polarforschung*, July 1996, No.212, Surface-sediment composition and sedimentary processes in the central Arctic Ocean and along the Eurasian Continental Margin. Edited by R. Stein, G.I. Ivanov, M.A. Levitan, and K. Fahl, p.89-95, 4 refs.

Sediments, Geomorphology, Sea ice, Bottom sediment, Marine deposits, Arctic Ocean, Russia—East Siberian Sea

51-3117

Biogenic barium and opal in shallow Eurasian shelf sediments in relation to the pelagic Arctic Ocean environment.

Nürnberg, D., *Berichte zur Polarforschung*, July 1996, No.212, Surface-sediment composition and sedimentary processes in the central Arctic Ocean and along the Eurasian Continental Margin. Edited by R. Stein, G.I. Ivanov, M.A. Levitan, and K. Fahl, p.96-118, 58 refs.

Sediments, Geochemistry, Mineralogy, Sea ice, Alluvium, Bottom sediment, Marine deposits, Arctic Ocean, Russia—Kara Sea, Russia—Laptev Sea

51-3118

Lithology and geochemistry of modern sediments of the Chukchi Sea.

Pavlidis, IU.A., Ogorodnikov, V.I., Shelekhova, E.S., Wahsner, M., *Berichte zur Polarforschung*, July 1996, No.212, Surface-sediment composition and sedimentary processes in the central Arctic Ocean and along the Eurasian Continental Margin. Edited by R. Stein, G.I. Ivanov, M.A. Levitan, and K. Fahl, p.119-125, 8 refs.

Sediments, Geochemistry, Lithology, Bottom sediment, Marine deposits, Arctic Ocean, Chukchi Sea

51-3119

Lithology of modern sediments in the eastern Barents Sea.

Pavlidis, M.A., *Berichte zur Polarforschung*, July 1996, No.212, Surface-sediment composition and sedimentary processes in the central Arctic Ocean and along the Eurasian Continental Margin. Edited by R. Stein, G.I. Ivanov, M.A. Levitan, and K. Fahl, p.126-134, 8 refs.

Lithology, Sediments, Maps, Bottom sediment, Marine deposits, Arctic Ocean, Barents Sea

51-3120

Lithology of bottom sediments of the central White Sea.

Shcherbakov, F.A., *Berichte zur Polarforschung*, July 1996, No.212, Surface-sediment composition and sedimentary processes in the central Arctic Ocean and along the Eurasian Continental Margin. Edited by R. Stein, G.I. Ivanov, M.A. Levitan, and K. Fahl, p.135-138, 3 refs.

Bottom sediment, Grain size, Marine deposits, Arctic Ocean, Russia—White Sea

51-3121

Aerosol size distribution over the Laptev Sea in July-September 1995: first results.

Smirnov, V.V., Shevchenko, V.P., Stein, R., Lisitsyn, A.P., Savchenko, A.V., *Berichte zur Polarforschung*, July 1996, No.212, Surface-sediment composition and sedimentary processes in the central Arctic Ocean and along the Eurasian Continental Margin. Edited by R. Stein, G.I. Ivanov, M.A. Levitan, and K. Fahl, p.139-143, 11 refs.

Aerosols, Distribution, Fog formation, Atmospheric boundary layer, Marine atmospheres, Arctic Ocean, Russia—Laptev Sea

51-3122

Surface sediments of the north-western Barents Sea.

Solheim, A., Elverhøi, A., *Berichte zur Polarforschung*, July 1996, No.212, Surface-sediment composition and sedimentary processes in the central Arctic Ocean and along the Eurasian Continental Margin. Edited by R. Stein, G.I. Ivanov, M.A. Levitan, and K. Fahl, p.144-158, 33 refs.

Surface waters, Sediments, Marine deposits, Sea ice, Arctic Ocean, Barents Sea

51-3123

Bulk mineralogy in surface sediments from the eastern central Arctic Ocean.

Vogt, C., *Berichte zur Polarforschung,* July 1996, No.212, Surface-sediment composition and sedimentary processes in the central Arctic Ocean and along the Eurasian Continental Margin. Edited by R. Stein, G.I. Ivanov, M.A. Levitan, and K. Fahl, p.159-171, 23 refs.

Surface waters, Sediments, Mineralogy, Marine deposits, Suspended sediments, Bottom sediment, Arctic Ocean

51-3124

Marine geological investigations of surface sediments in the Franz-Josef-Land area and the St. Anna Trough.

Wahsner, M., Ivanov, G., Tarasov, G., *Berichte zur Polarforschung,* July 1996, No.212, Surface-sediment composition and sedimentary processes in the central Arctic Ocean and along the Eurasian Continental Margin. Edited by R. Stein, G.I. Ivanov, M.A. Levitan, and K. Fahl, p.172-184, 16 refs.

Surface waters, Sediments, Mineralogy, Marine deposits, Suspended sediments, Bottom sediment, Arctic Ocean, Russia—Franz Josef Land

51-3125

Holocene sediments of the East Arctic seas.

IAshin, D.S., Kosheleva, V.A., *Berichte zur Polarforschung,* July 1996, No.212, Surface-sediment composition and sedimentary processes in the central Arctic Ocean and along the Eurasian Continental Margin. Edited by R. Stein, G.I. Ivanov, M.A. Levitan, and K. Fahl, p.185-189, 5 refs.

Sediments, Lithology, Geochronology, Marine geology, Marine deposits, Bottom sediment, Arctic Ocean, Russia—Laptev Sea, Russia—East Siberian Sea, Chukchi Sea

51-3126

Organic matter in bottom sediments of the White Sea.

Artem'ev, V.E., Petrova, V.I., *Berichte zur Polarforschung,* July 1996, No.212, Surface-sediment composition and sedimentary processes in the central Arctic Ocean and along the Eurasian Continental Margin. Edited by R. Stein, G.I. Ivanov, M.A. Levitan, and K. Fahl, p.191-200, 10 refs.

Bottom sediment, Geochemistry, Water pollution, Hydrocarbons, Arctic Ocean, Russia—White Sea

51-3127

Riverine and autochthonous contributions to Kara Sea sediment lipids.

Beliaeva, N.A., Madureira, L.A.S., Eglinton, G., *Berichte zur Polarforschung,* July 1996, No.212, Surface-sediment composition and sedimentary processes in the central Arctic Ocean and along the Eurasian Continental Margin. Edited by R. Stein, G.I. Ivanov, M.A. Levitan, and K. Fahl, p.201-212, 17 refs.

Sediments, Geochemistry, Alluvium, River flow, Runoff, Sediment transport, Marine deposits, Bottom sediment, Arctic Ocean, Russia—Kara Sea, Russia—Ob' River

51-3128

Distribution of plant pigments in surface sediments of the eastern Arctic.

Boetius, A., Grahl, C., Kröncke, I., Liebezeit, G., Nöthig, E.M., *Berichte zur Polarforschung,* July 1996, No.212, Surface-sediment composition and sedimentary processes in the central Arctic Ocean and along the Eurasian Continental Margin. Edited by R. Stein, G.I. Ivanov, M.A. Levitan, and K. Fahl, p.213-218, 12 refs.

Sediments, Chlorophylls, Marine deposits, Suspended sediments, Bottom sediment, Plants (botany), Arctic Ocean, Barents Sea

51-3129

Polycyclic arenes in bottom sediments of the Barents Sea.

Petrova, V., Batova, G., *Berichte zur Polarforschung,* July 1996, No.212, Surface-sediment composition and sedimentary processes in the central Arctic Ocean and along the Eurasian Continental Margin. Edited by R. Stein, G.I. Ivanov, M.A. Levitan, and K. Fahl, p.219-229, 21 refs.

Bottom sediment, Hydrocarbons, Geochemistry, Water pollution, Arctic Ocean, Barents Sea

51-3130

***n*-Alkane distribution in surface sediments from the eastern central Arctic Ocean: preliminary results and perspectives.**

Schubert, C.J., Stein, R., *Berichte zur Polarforschung,* July 1996, No.212, Surface-sediment composition and sedimentary processes in the central Arctic Ocean and along the Eurasian Continental Margin. Edited by R. Stein, G.I. Ivanov, M.A. Levitan, and K. Fahl, p.230-242, 35 refs.

Pollution, Geochemistry, Marine deposits, Bottom sediment, Suspended sediments, Arctic Ocean, Barents Sea

51-3131

Organic-carbon and carbonate distribution in surface sediments from the eastern central Arctic Ocean and the Eurasian continental margin: sources and pathways.

Stein, R., *Berichte zur Polarforschung,* July 1996, No.212, Surface-sediment composition and sedimentary processes in the central Arctic Ocean and along the Eurasian Continental Margin. Edited by R. Stein, G.I. Ivanov, M.A. Levitan, and K. Fahl, p.243-267, 35 refs.

Geochemistry, Organic nuclei, Sediments, Ice edge, Plankton, Marine deposits, Suspended sediments, Bottom sediment, Arctic Ocean, Russia—Laptev Sea, Russia—Kara Sea, Barents Sea

51-3132

Distribution of deep-sea ostracoda in the Arctic Ocean.

Cronin, T.M., *Berichte zur Polarforschung,* July 1996, No.212, Surface-sediment composition and sedimentary processes in the central Arctic Ocean and along the Eurasian Continental Margin. Edited by R. Stein, G.I. Ivanov, M.A. Levitan, and K. Fahl, p.269-284, 18 refs.

Microbiology, Sediments, Animals, Distribution, Maps, Marine biology, Marine deposits, Arctic Ocean

51-3133

Benthic foraminifera and carbonate dissolution in the surface sediments of the Barents and Kara Seas.

Hald, M., Steinsund, P.I., *Berichte zur Polarforschung,* July 1996, No.212, Surface-sediment composition and sedimentary processes in the central Arctic Ocean and along the Eurasian Continental Margin. Edited by R. Stein, G.I. Ivanov, M.A. Levitan, and K. Fahl, p.285-307, 66 refs.

Hydrography, Microbiology, Sediments, Marine biology, Marine deposits, Arctic Ocean, Barents Sea, Russia—Kara Sea

51-3134

Modern benthic foraminiferal assemblages in the Kara Sea.

Khusid, T.K., Korsum, S.A., *Berichte zur Polarforschung,* July 1996, No.212, Surface-sediment composition and sedimentary processes in the central Arctic Ocean and along the Eurasian Continental Margin. Edited by R. Stein, G.I. Ivanov, M.A. Levitan, and K. Fahl, p.308-314, 16 refs.

Marine biology, Microbiology, Sediments, Marine deposits, Arctic Ocean, Russia—Kara Sea

51-3135

Diatoms of the Eurasian Arctic Seas and their distribution in surface sediments.

Poliakova, E.I., *Berichte zur Polarforschung,* July 1996, No.212, Surface-sediment composition and sedimentary processes in the central Arctic Ocean and along the Eurasian Continental Margin. Edited by R. Stein, G.I. Ivanov, M.A. Levitan, and K. Fahl, p.315-324, 23 refs.

Marine biology, Sediments, Microbiology, Marine deposits, Arctic Ocean, Chukchi Sea, Russia—East Siberian Sea, Russia—Laptev Sea, Russia—Kara Sea, Barents Sea

51-3136

Antarctic icebergs and international law.

Trombetta-Panigadi, F., *Collana di studi, Istituto di diritto pubblico e internazionale, Facoltà di giurisprudenza, Università degli studi di Siena,* 1987, No.4, Droit international de l'Antarctique/International law for Antarctica. Edited by F. Francioni and T. Scovazzi, p.421-441, 47 refs.

DLC JX4084.A5I58 1987

Icebergs, Iceberg towing, Legislation, Economic development, Natural resources

This paper considers the following: the Antarctic Treaty System and icebergs; various kinds of ice formation; iceberg exploitation and the law of the sea; and potential consequences of the transport of icebergs. (Auth. mod.)

51-3137

Physical configuration of Antarctica: a summary.

Francalanci, G., Pieri, M., *Collana di studi, Istituto di diritto pubblico e internazionale, Facoltà di giurisprudenza, Università degli studi di Siena,* 1987, No.4, Droit international de l'Antarctique/International law for Antarctica. Edited by F. Francioni and T. Scovazzi, p.483-495, 3 refs.

DLC JX4084.A5I58 1987

Geomorphology, Continental drift, Ice volume, Maps

The present physical configuration of Antarctica is the result of its geological history. This article gives a brief account of that history. The continent, which in separating itself from other parts of the old Pangea (South America, Africa, Malagasy, India, Sri Lanka, Australia, New Zealand) constitutes one of the poles of the terrestrial axis, is considered to be a laboratory which can still reveal many secrets. Various geological and glaciological maps accompany the text.

51-3138

Colonisation vs. disturbance: the effect of sustained ice-scouring on intertidal communities.

Pugh, P.J.A., Davenport, J., *Journal of experimental marine biology and ecology,* Feb. 25, 1997, 210(1), p.1-21, Refs. p.19-21.

Biomass, Sea ice, Ice scoring, Mechanical properties, Marine biology, —South Georgia

Shoreline plant and animal communities close to a retreating tidewater glacier on South Georgia displayed a series of physical and biological gradients from the open sea to the glacier terminus. These included increasing scoring intensity caused by floating and/or grounded ice fragments as well as decreasing diversity and abundance of both macroflora and macrofauna. The correlation between gradients suggests that shoreline scoring intensity can be directly quantified from plant diversity and abundance, and that the colonization of coastlines exposed to sustained ice-scoring is not stochastic like that following single massive ice-scoring events, but directional like recovery from small scale disturbance events is much more rapid than that associated with continual scoring. Indeed recovery from continual scoring is so protracted that affected shores are held for a prolonged period at a particular phase of the normal spring annual spring colonization process by local ice-scoring intensity. (Auth.)

51-3139

Glaciers, ice sheets and volcanoes: a tribute to Mark F. Meier.

Colbeck, S.C., ed, SR 96-27, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Oct. 1996, 120p., ADA-321 342, Refs. passim. For selected papers see 51-3140 through 51-3156. Presented at special sessions at the 1995 Fall Meeting of the American Geophysical Union.

Glaciers, Ice sheets, Volcanoes, Glacier surveys, Glacier thickness, Glacier mass balance

51-3140
Properties and processes affecting sublimation rates in layered firn.
Albert, M.R., MP 4008, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Oct. 1996, SR 96-27, p.1-4, ADA-321 342, 5 refs.
Firn, Sublimation, Snow permeability, Air flow, Mass transfer, Greenland—Summit

51-3141
Comparison of passive microwave techniques for detecting snowpack melt on the Greenland ice sheet.
Anderson, M.R., Mote, T., Abdalati, W., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Oct. 1996, SR 96-27, p.5-9, ADA-321 342, 2 refs.
Ice sheets, Snowmelt, Microwaves, Remote sensing, Climatic changes, Greenland

51-3142
Analysis of mass balance indicators in the new glacier inventory of the former Soviet Union.
Bedford, D.P., Barry, R.G., Haggerty, C., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Oct. 1996, SR 96-27, p.12-16, ADA-321 342, 6 refs.
Glacier mass balance, Glacier surveys, Climatic changes, Russia—Kamchatka Peninsula, Russia—Franz Josef Land, Russia—Novaya Zemlya, CIS—Central Asia, Caucasus

51-3143
Mapping ice sheet topography with laser altimetry in Greenland.
Csathó, B.M., Thomas, R.H., Krabill, W.B., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Oct. 1996, SR 96-27, p.19-25, ADA-321 342, 9 refs.
Mapping, Topographic maps, Airborne equipment, Ice sheets, Height finding, Lasers, Data processing, Greenland

51-3144
Mechanism for the generation of flow stripes on ice streams.
Gudmundsson, G.H., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Oct. 1996, SR 96-27, p.30-33, ADA-321 342, 7 refs.
Glacier flow, Models, Rheology, Glacier thickness

51-3145
Ice-volcano interaction at the subglacial Grímsvötn Volcano, Iceland.
Gudmundsson, M.T., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Oct. 1996, SR 96-27, p.34-40, ADA-321 342, 19 refs.
Volcanoes, Ice cover, Ice shelves, Meltwater, Subglacial observations, Magma, Ice melting, Ice surface, Iceland

51-3146
Short wavelength variations in the horizontal velocity field of a valley glacier.
Harper, J.T., Humphrey, N.F., Pfeffer, W.T., Welch, B.C., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Oct. 1996, SR 96-27, p.41-48, ADA-321 342, 17 refs.
Glacier flow, Crevasses, Glacier surfaces, Velocity measurement, United States—Alaska—Worthington Glacier

51-3147
On the mass balance of West Antarctica's Pine Island Glacier.
Jacobs, S.S., Jenkins, A., Hellmer, H.H., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Oct. 1996, SR 96-27, p.52-56, ADA-321 342, 21 refs.
Glacier mass balance, Glacier thickness, Ice sheets, Ice shelves, Ice water interface, Ice melting, Antarctica—Pine Island Glacier
Preceptions of the total mass of the antarctic ice sheet have changed much faster over recent decades than any conceivable climate-related changes, as Mark Meier has illustrated. A search for evidence that might fit the Meier steady-growth principle led the authors to review the mass balance problem for Pine Island Glacier, (PIG), a key element of the West Antarctic Ice Sheet. The PIG example illustrates that basal melting may be underestimated. Moreover, the history of estimates of the net mass balance at the base of antarctic ice shelves shows a trend analogous to that of the total mass of the ice sheet. It appears that the ocean currently melts away a mass equivalent to approximately one-third of the recently increased annual accumulation on the antarctic ice sheet. (Auth. mod.)

51-3148
Shortwave radiation geometry and glacier distribution in the Cordillera Real, Bolivia.
Klein, A.G., Masek, J.G., Isacks, B.L., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Oct. 1996, SR 96-27, p.57-61, ADA-321 342, 10 refs.
Solar radiation, Glacier ablation, Glacier surveys, Insolation, Bolivia—Cordillera Real

51-3149
Glacier mass balance using the grid-index method.
Krimmel, R.M., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Oct. 1996, SR 96-27, p.62-68, ADA-321 342, 4 refs.
Glacier mass balance, Models, Altitude, Snow depth, United States—Washington—South Cascade Glacier

51-3150
Changing mode of ice flow during advances of Hintereisferner.
Kuhn, M.H., Span, N., Schneider, H., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Oct. 1996, SR 96-27, p.69-74, ADA-321 342, 10 refs.
Glacier flow, Basal sliding, Glacier mass balance, Glacier ablation, Glacier alimentation, Austria—Hintereisferner

51-3151
Tephrastratigraphy of ablation areas of Vatnajökull Ice Cap, Iceland.
Larsen, G., Gudmundsson, M.T., Björnsson, H., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Oct. 1996, SR 96-27, p.75-80, ADA-321 342, 15 refs.
Volcanoes, Glacier ablation, Stratigraphy, Iceland—Vatnajökull

51-3152
Lava and ice interaction: controls on lava flow morphology and texture.
Lescinsky, D.T., Fink, J.H., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Oct. 1996, SR 96-27, p.81-88, ADA-321 342, 38 refs.
Volcanoes, Glacier ice, Glacier melting, Mountain glaciers, United States—Washington—Rainier, Mount

51-3153
Counting glaciers: use of scaling methods to estimate the number and size distribution of the glaciers of the world.
Meier, M.F., Bahr, D.B., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Oct. 1996, SR 96-27, p.89-94, ADA-321 342, 13 refs.
Glacier surveys, Glacier ice, Glacier thickness, Mountain glaciers, Ice sheets

51-3154
Greenland climate network: GC-Net.
Steffen, K., Box, J., Abdalati, W., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Oct. 1996, SR 96-27, p.98-103, ADA-321 342, 6 refs.
Ice sheets, Mass balance, Snow accumulation, Snow depth, Climatic changes, Global change, Climatology, Weather stations, Greenland

51-3155
Maximum resolution glacier-bed surface obtained by radio-echo sounding.
Welch, B.C., Pfeffer, W.T., Harper, J.T., Humphrey, N.F., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Oct. 1996, SR 96-27, p.105-110, ADA-321 342, 9 refs.
Glacier beds, Topographic maps, Radio echo soundings, Glacier thickness, Data processing, Glacier surfaces, Remote sensing, United States—Alaska—Worthington Glacier

51-3156

Retracking algorithm for satellite radar altimetry over an ice sheet and its applications.

Yi, D., Bentley, C.R., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Oct. 1996, SR 96-27, p.112-120, ADA-321 342, 19 refs.

Ice sheets, Height finding, Wind factors, Mathematical models, Scattering, Radar, Spacecraft, Antarctica—East Antarctica

Both surface scattering and volume scattering contribute energy to satellite-radar-altimeter return waveforms over a continental ice sheet. Here, the authors present a retracking algorithm that includes surface scattering and volume scattering, and, for the first time, also includes the surface topography, the satellite pointing angle and the curvature of the earth in both the surface-scattering and volume-scattering models. The algorithm can yield surface elevation values for individual waveforms. At the same time, quantitative estimates of the surface roughness and signal penetration and their regional and seasonal variations can be obtained. The authors have applied the algorithm to Geosat data over a section (69°S-72.1°S and 80°E-140°E) of East Antarctica. Generally, the spatial variation of the parameters is not a function of elevation, but is related to the drainage systems. Seasonal variations show clearly from 80°E to 95°E but are not very clear from 96°E to 140°E. The results are compared with those of previous retracking systems. (Auth.)

51-3157

Proceedings of conference.

Techniques and Technologies for Hydrocarbon Remediation in Cold and Arctic Climates [Workshop], Kingston, Ontario, June 6-7, 1995, Kingston, Ontario, Royal Military College of Canada, [1995], 271p., Refs. passim. For selected papers see 51-3158 through 51-3174.

Oil spills, Soil pollution, Soil chemistry, Frozen ground chemistry, Soil microbiology, Waste disposal, Ground water, Water pollution, Water treatment, Military facilities, Land reclamation

51-3158

Effects of petroleum spills on permafrost.

Biggar, K.W., Techniques and Technologies for Hydrocarbon Remediation in Cold and Arctic Climates [Workshop], Kingston, Ontario, June 6-7, 1995. Conference proceedings, Kingston, Ontario, Royal Military College of Canada, [1995], p.2-11, 27 refs.

Oil spills, Soil pollution, Water pollution, Permafrost hydrology, Frozen ground chemistry, Frozen ground strength, Freeze thaw cycles, Soil water migration

51-3159

Potential removal of petroleum products from the soil in northern territories by the bio-electrokinetic method.

Elektorowicz, M., Boeva, V., Mbono, P., Techniques and Technologies for Hydrocarbon Remediation in Cold and Arctic Climates [Workshop], Kingston, Ontario, June 6-7, 1995. Conference proceedings, Kingston, Ontario, Royal Military College of Canada, [1995], p.12-22.

Oil spills, Oil recovery, Soil pollution, Waste treatment, Frozen ground chemistry, Soil microbiology, Nutrient cycle, Land reclamation, Cold weather operation

51-3160

Bioremediation of petroleum contaminated soils in a colder region of Canada.

Baweja, A.S., McNicoll, D.M., Techniques and Technologies for Hydrocarbon Remediation in Cold and Arctic Climates [Workshop], Kingston, Ontario, June 6-7, 1995. Conference proceedings, Kingston, Ontario, Royal Military College of Canada, [1995], p.24-35, 5 refs.

Military facilities, Oil spills, Oil recovery, Waste treatment, Soil pollution, Soil chemistry, Soil microbiology, Land reclamation, Canada—Ontario—Petawawa Canadian Forces Base

51-3161
Rhizosphere enhanced bioremediation for cold regions: contaminant effects on root distribution.
Reynolds, C.M., Beyrouty, C.A., Wolf, D.C., Walworth, J.L., MP 4004, Techniques and Technologies for Hydrocarbon Remediation in Cold and Arctic Climates [Workshop], Kingston, Ontario, June 6-7, 1995. Conference proceedings, Kingston, Ontario, Royal Military College of Canada, [1995], p.36-49, 12 refs.
Oil spills, Soil pollution, Soil chemistry, Soil microbiology, Revegetation, Protective vegetation, Roots, Plant physiology, Plant ecology, Waste treatment, Land reclamation
Increased microbial activity in rhizosphere soil compared to non-rhizosphere soil suggests opportunities for enhancing bioremediation by using plants. Plant-based systems would involve minimal initial cost and low maintenance. Because mass-transfer rates in soil may limit bioremediation, the success of rhizosphere-based soil treatment depends on the spatial relationship between contaminated soil and roots. Increasing the spatial density and distribution of roots would increase the amount of soil beneficially influenced by rhizosphere effects, yet the influence of contaminated soil zones on root distribution is relatively unknown. The authors are investigating the impact of soil contamination on plant growth, root growth, root distribution, and rhizosphere-associated microbial activity in contaminated soils. It is suggested that, due to increased percentages of contaminant degraders in the rhizosphere, there is potential for rhizosphere stimulation of bioremediation. Moreover, roots can penetrate into soil zones contaminated with organic compounds, but the degree of root growth is related to contaminant, plant species, and interactions with soil factors such as soil moisture, which may likewise be influenced by contaminant zones. These processes may impact both the effective use and monitoring of rhizosphere-enhanced phytoremediation.

51-3162
Remediation methods for hydrocarbon contamination in the Arctic.
Reimer, K.J., Rogers, J.M., Techniques and Technologies for Hydrocarbon Remediation in Cold and Arctic Climates [Workshop], Kingston, Ontario, June 6-7, 1995. Conference proceedings, Kingston, Ontario, Royal Military College of Canada, [1995], p.50-57, 9 refs.
Military facilities, Oil spills, Soil pollution, Soil chemistry, Waste disposal, Land reclamation, Cold weather operation, Canada

51-3163
Applications testing with the Environment Canada membrane based processes.
Whittaker, H., Techniques and Technologies for Hydrocarbon Remediation in Cold and Arctic Climates [Workshop], Kingston, Ontario, June 6-7, 1995. Conference proceedings, Kingston, Ontario, Royal Military College of Canada, [1995], p.58-81, Figures are cited but do not appear in the text.
Soil pollution, Soil chemistry, Oil spills, Waste disposal, Water pollution, Water treatment, Filters, Land reclamation

51-3164
Research strategies for development of predictive and remedial measures for oil spills in permafrost regions.
Williams, P.J., Rees, W.G., Riseborough, D.W., White, T.L., Winnicky, K., Techniques and Technologies for Hydrocarbon Remediation in Cold and Arctic Climates [Workshop], Kingston, Ontario, June 6-7, 1995. Conference proceedings, Kingston, Ontario, Royal Military College of Canada, [1995], p.82-95, 18 refs.
Oil spills, Soil pollution, Frozen ground chemistry, Permafrost hydrology, Permafrost preservation, Waste disposal, Land reclamation, Research projects

51-3165
Development and commercialization of the Waterloo Barrier™ containment wall.
Laird, R.C.G., Techniques and Technologies for Hydrocarbon Remediation in Cold and Arctic Climates [Workshop], Kingston, Ontario, June 6-7, 1995. Conference proceedings, Kingston, Ontario, Royal Military College of Canada, [1995], p.96-104, 2 refs.
Soil pollution, Ground water, Water pollution, Soil stabilization, Land reclamation, Steel structures, Walls, Sealing, Grouting, Waterproofing, Cost analysis

51-3166
Biopile technology for the remediation of hydrocarbon contaminated sites in northern regions: full-scale case studies.
Pouliot, Y., Techniques and Technologies for Hydrocarbon Remediation in Cold and Arctic Climates [Workshop], Kingston, Ontario, June 6-7, 1995. Conference proceedings, Kingston, Ontario, Royal Military College of Canada, [1995], p.113-117.
Oil spills, Soil pollution, Soil chemistry, Soil microbiology, Frozen ground chemistry, Waste disposal, Land reclamation, Cost analysis

51-3167
Daramend™ bioremediation of soil containing petroleum hydrocarbons at Canadian Forces Station Alert, N.W.T. (pilot-scale demonstration).
Fisher, D.R., Marvan, I.J., Seech, A.G., Greetham, S., Techniques and Technologies for Hydrocarbon Remediation in Cold and Arctic Climates [Workshop], Kingston, Ontario, June 6-7, 1995. Conference proceedings, Kingston, Ontario, Royal Military College of Canada, [1995], p.119-125, 9 refs.
Military facilities, Oil spills, Soil pollution, Soil chemistry, Soil microbiology, Waste disposal, Land reclamation, Canada—Northwest Territories—Alert

51-3168
Evaluation of technologies for treating groundwater contaminated with BTEXs.
Ladanowski, C., Techniques and Technologies for Hydrocarbon Remediation in Cold and Arctic Climates [Workshop], Kingston, Ontario, June 6-7, 1995. Conference proceedings, Kingston, Ontario, Royal Military College of Canada, [1995], p.126-161, 12 refs.
Gas production, Oil spills, Soil pollution, Soil chemistry, Ground water, Water pollution, Water chemistry, Water treatment, Waste disposal, Land reclamation, Cost analysis, Canada—Alberta—Rocky Mountain House

51-3169
Low temperature thermal desorption (LTTD) remediation of hydrocarbon contaminated soil at remote and cold climate sites.
Johnson, M., Techniques and Technologies for Hydrocarbon Remediation in Cold and Arctic Climates [Workshop], Kingston, Ontario, June 6-7, 1995. Conference proceedings, Kingston, Ontario, Royal Military College of Canada, [1995], p.162-168.
Oil spills, Soil pollution, Frozen ground chemistry, Waste disposal, Artificial thawing, Evaporation, Land reclamation, Cold weather operation

51-3170
Neutron moisture probe measurements of fluid displacement during in-situ air sparging.
McKay, D.J., Acomb, L.J., Currier, P.M., MP 4005, Techniques and Technologies for Hydrocarbon Remediation in Cold and Arctic Climates [Workshop], Kingston, Ontario, June 6-7, 1995. Conference proceedings, Kingston, Ontario, Royal Military College of Canada, [1995], p.169-190, 18 refs.
Oil spills, Soil pollution, Soil chemistry, Ground water, Water pollution, Waste disposal, Water treatment, Aeration, Land reclamation, Neutron probes, United States—Alaska—Hinchinbrook Island
Strawberry Point, located on Hinchinbrook I., AK is the site of a Federal Aviation Administration air navigation facility that is contaminated with gasoline- and diesel-range hydrocarbons in soil and groundwater. Air sparging and bioventing systems were installed to promote bioremediation in the zone of seasonal groundwater fluctuation where the contaminant is concentrated. The air sparging system is being evaluated to determine groundwater region of influence and optimum frequency of operation. The system will also be evaluated for oxygen transfer efficiency and microbial uptake. The sparge wells were installed in a homogeneous formation consisting of fine-grain beach and eolian sands. Neutron probe borehole measurements of percent fluid displacement during sparging at two wells revealed dynamic air distributions defined by an initial and relatively rapid expansion phase followed by a consolidation phase. Air distribution was stable within 12 hours after startup, reaching a peak air saturation of greater than 50%. The radius of peak expansion varied with time and depth. The percent air saturation stabilized within 1 hour following cutoff of the air flow, leaving pockets of entrapped air near the water table. When air injection was resumed, air saturation levels were found to be repeatable. The findings for this site indicated that frequent pulsing is needed to optimize oxygen distribution.

51-3171
Free product fuel recovery: the Goose Bay experience.
Lammey, J.P., Techniques and Technologies for Hydrocarbon Remediation in Cold and Arctic Climates [Workshop], Kingston, Ontario, June 6-7, 1995. Conference proceedings, Kingston, Ontario, Royal Military College of Canada, [1995], p.191-204.
Military facilities, Airports, Oil spills, Oil recovery, Soil pollution, Ground water, Water pollution, Waste disposal, Water treatment, Land reclamation, Canada—Labrador—Goose Bay

51-3172
United States Air Force guidelines for successfully supporting intrinsic remediation with an example from Hill Air Force Base.
Wiedemeier, T.H., Wilson, J.T., Miller, R.N., Kampbell, D.H., Techniques and Technologies for Hydrocarbon Remediation in Cold and Arctic Climates [Workshop], Kingston, Ontario, June 6-7, 1995. Conference proceedings, Kingston, Ontario, Royal Military College of Canada, [1995], p.206-223, 11 refs.
Military facilities, Oil spills, Soil pollution, Soil chemistry, Soil microbiology, Waste disposal, Land reclamation, United States—Utah—Hill Air Force Base

51-3173
Patterns of intrinsic bioremediation at two United States Air Force bases.
Wiedemeier, T.H., Swanson, M.A., Wilson, J.T., Kampbell, D.H., Miller, R.N., Hansen, J.E., Techniques and Technologies for Hydrocarbon Remediation in Cold and Arctic Climates [Workshop], Kingston, Ontario, June 6-7, 1995. Conference proceedings, Kingston, Ontario, Royal Military College of Canada, [1995], p.224-249, 8 refs.
Military facilities, Oil spills, Soil pollution, Soil chemistry, Soil microbiology, Waste disposal, Land reclamation

51-3174
Method for protecting and cleaning soils from petroleum products.
Russian Scientific Center, Applied Chemistry (Rossiĭskiĭ nauchnyĭ tsentr "Prikladnaia khimiia"), St. Petersburg 197198, Russia, Techniques and Technologies for Hydrocarbon Remediation in Cold and Arctic Climates [Workshop], Kingston, Ontario, June 6-7, 1995. Conference proceedings, Kingston, Ontario, Royal Military College of Canada, [1995], p.251-264.
Oil spills, Soil pollution, Soil chemistry, Waste disposal, Land reclamation

51-3175
Compositions of wax esters, triacylglycerols and phospholipids in arctic and antarctic copepods: evidence of energetic adaptations.
Albers, C.S., Kattner, G., Hagen, W., *Marine chemistry*, Dec. 1996, 55(3-4), p.347-358, 40 refs.
Marine biology, Biomass, Plankton, Cold weather survival, Nutrient cycle, Chemical composition, Sampling, Seasonal variations
The fatty acid and fatty alcohol compositions of wax esters, triacylglycerols and phospholipids were determined in the antarctic copepods. The wax esters of the herbivorous species were clearly characterized by the long-chain monounsaturated fatty acids and alcohols, whereas the omnivorous and carnivorous species usually had high relative amounts of fatty acids and of short-chain saturated alcohols. The wax ester-storing herbivorous species have developed similar lipid biochemical adaptations in both polar oceans. In contrast, predominantly triacylglycerol-storing species occur only in antarctic waters. In both, arctic and antarctic species, the fatty acid compositions of the phospholipids showed a pronounced uniformity. The extremely high degree of unsaturation is extraordinary as compared to other marine taxa. (Auth. mod.)

51-3176
Volatile halocarbons released from arctic macroalgae.
Laturnus, F., *Marine chemistry*, Dec. 1996, 55(3-4), p.359-366, 35 refs.
Marine biology, Algae, Biomass, Plant physiology, Sampling, Classifications, Hydrocarbons, Natural gas, Sea water, Environmental tests, Environmental impact, Arctic Ocean

51-3177

Evolution in polarimetric signatures of thin saline ice under constant growth.

Nghiem, S.V., et al, MP 4007, *Radio science,* Jan.-Feb. 1997, 32(1), p.127-151, 44 refs.

Sea ice distribution, Ice models, Remote sensing, Ice surveys, Ice growth, Brines, Ice cover thickness, Salt ice, Radar echoes, Ice dielectrics, Electromagnetic properties, Backscattering, Polarization (waves), Simulation, Correlation

An experiment is carried out to measure polarimetric backscatter signatures at C band together with physical characteristics of thin saline ice grown at a constant rate under quiescent conditions. The objectives are to investigate the electromagnetic scattering mechanism in saline ice, to relate the polarimetric backscatter to ice physical characteristics, and to assess the inversion of ice thickness from backscatter data. Controlled laboratory conditions are utilized to avoid complicated variations in interrelated characteristics of saline ice and the environment. The ice sheet was grown in a refrigerated facility at the U.S. Army Cold Regions Research and Engineering Laboratory. Growth conditions, thickness and growth rate, temperatures and salinities, and internal and interfacial structures of the ice sheet were monitored. Measurements indicate that the laboratory saline ice has characteristics similar to thin sea ice in the Arctic. Backscattering coefficients of the saline ice sheet are shown to be similar to airborne radar measurements of thin sea ice growing in a newly opened lead in the Beaufort Sea. For the inversion the large increase in backscatter indicates that the ice thickness is retrievable for thin ice grown under the conditions in this experiment. More complicated conditions should be considered in future experiments to study their effects on the retrieval of sea ice parameters. (Auth. mod.)

51-3178

Kinetic aspects of the reaction of supercooled water vapors with ice-forming reagents.

IAtsimirskiĭ, V.K., Budarin, V.L., Oleksenko, L.P., *Ukrainian chemistry journal,* 1995, 61(3), p.16-20, Translated from Ukrainskiĭ khimicheskiĭ zhurnal. 2 refs.

Ice physics, Cloud physics, Water vapor, Steam, Supercooling, Ice crystal growth, Organic nuclei, Heterogeneous nucleation, Nucleation rate, Ice vapor interface, Cloud chambers, Simulation

51-3179

Origin of ice-rafted debris: Pleistocene paleoceanography in the western Arctic Ocean.

Bischof, J., Clark, D.L., Vincent, J.S., *Paleoceanography,* Dec. 1996, 11(6), p.743-756, 40 refs.

Pleistocene, Oceanography, Sediment transport, Ice rafting, Periodic variations, Bottom sediment, Drill core analysis, Lithology, Stratigraphy, Geochemistry, Grain size, Glacier oscillation, Arctic Ocean

51-3180

Sodar performance and preliminary results after one year of measurements at Adélie Land Coast, East Antarctica.

Argentini, S., Mastrantonio, G., Viola, A., Pettre, P., Dargaud, G., *Boundary-layer meteorology,* Oct. 1996, 81(1), p.75-103, 25 refs.

Wind (meteorology), Velocity measurement, Sodar, Turbulent boundary layer, Seasonal variations, Sounding, Profiles, Statistical analysis, Topographic effects, Antarctica—Adélie Coast

Dumont d'Urville, on the antarctic coast, is an area well known for the presence of strong katabatic winds blowing from the antarctic plateau toward the sea almost all year. Since Jan. 1993, a three-axis Doppler sodar has been operating in this area to investigate the variability of the boundary layer structure and dynamics. In this paper, the capabilities, behavior and advantages of using this ground-based remote-sensing system in Antarctica are evaluated after one year of measurements. This instrument may play an important role in boundary layer studies in remote regions where other profiling techniques (e.g., kitoons, slow ascent balloons) are difficult and expensive. The statistical analysis of the wind speed shows that the wind blows from the 30° angular sectors centered at 90°, 150°, 180°, and 0°. The winds from 90° and 150° constitute the main local circulation and have, most of the time, the characteristics of a katabatic flow, whereas the winds blowing from 180°, arising from the surface temperature difference between the sea and the land, are land breezes. Strong winds coming from the ocean (0°), attributable to the inland penetration of depressions, have been observed in May, Oct., and Nov. (Auth. mod.)

51-3181

Crystallization of amorphous water ice in the solar system.

Jenniskens, P., Blake, D.F., *Astrophysical journal,* Dec. 20, 1996, 473(2)pt.1, p.1104-1113, 69 refs.

Extraterrestrial ice, Amorphous ice, Ice physics, Ice water interface, Ice formation, Phase transformations, Nucleation rate, Heating, Impurities, Viscosity, Electron microscopy, Temperature effects, Simulation

51-3182

Patterns of hydrogen bonding in water and ice.

Attard, P., *Physica A,* Dec. 1, 1996, 233(3-4), International Conference on Pattern Formation, Fractals and Statistical Mechanics, Sydney, Australia, Jan. 4-5, 1996. Proceedings, p.742-753, 19 refs.

Ice physics, Ice models, Latticed structures, Molecular structure, Hydrogen bonds, Defects, Mathematical models, Ions, Molecular energy levels

51-3183

Snowmelt on the Greenland ice sheet as derived from passive microwave satellite data.

Abdalati, W., Steffen, K., *Journal of climate,* Feb. 1997, 10(2), p.165-175, 22 refs.

Climatology, Ice sheets, Geophysical surveys, Snow cover effect, Air temperature, Snow air interface, Snowmelt, Radiation absorption, Radiometry, Spacecraft, Seasonal variations, Correlation, Brightness, Greenland

51-3184

Elevation dependency of the surface climate change signal: a model study.

Giorgi, F., Hurrell, J.W., Marinucci, M.R., Beniston, M., *Journal of climate,* Feb. 1997, 10(2), p.288-296, 22 refs.

Climatology, Global warming, Alpine landscapes, Air temperature, Surface temperature, Altitude, Snowmelt, Runoff, Albedo, Seasonal variations, Statistical analysis, Hydrologic cycle, Surface energy, Topographic effects, Simulation

51-3185

Interaction processes between the annual wave and the disturbances in series of daily temperature.

Minetti, J.L., Vargas, W.M., *Journal of climate,* Feb. 1997, 10(2), p.297-305, 24 ref.

Climatology, Atmospheric boundary layer, Atmospheric circulation, Synoptic meteorology, Air temperature, Seasonal variations, Snow accumulation, Snow cover effect, Models, Statistical analysis

51-3186

Validation of the snow submodel of the biosphere-atmosphere transfer scheme with Russian snow cover and meteorological observational data.

Yang, Z.L., Dickinson, R.E., Robock, A., Vinnikov, K.IA., *Journal of climate,* Feb. 1997, 10(2), p.353-373, 50 refs.

Climatology, Surface temperature, Snow cover distribution, Snow cover effect, Snow depth, Ablation, Seasonal variations, Snow water equivalent, Snow air interface, Wind factors, Radiation absorption, Mathematical models, Simulation, Forecasting

51-3187

Influence of variable-thickness ice on the loads exerted on sloping structures.

Timco, G.W., Cornett, A.M., *National Research Council Canada. Canadian Hydraulics Centre. Technical report,* Sep. 1996, HYD-TR-020, 68p. + appends., 17 refs. With comments by K.R. Croasdale in Appendix C.

Ice models, Ice solid interface, Ice loads, Ice cover thickness, Loads (forces)

51-3188

Arctic sea ice ecosystem.

Mel'nikov, I.A., Amsterdam, Gordon and Breach Science Publishers, 1997, 204p., Refs. p.155-172. For Russian original see 46-2143.

Ecosystems, Sea ice, Plankton, Ecology, Plants (botany), Marine biology, Microbiology, Ice cover, Ice cover thickness, Microelement content, Sea water, Water chemistry

51-3189

Schematic maps of the ice fields of Patagonia and Tierra del Fuego at 1:500 000. [Mapas esquematicos de los campos de hielo de Patagonia y Tierra del Fuego al 1/500 000]

Lliboutry, L., 1981, 4 sheets, In Spanish.

Aerial surveys, Maps, Charts, Glacier surveys, Ice sheets, —Tierra del Fuego, —Patagonia

This representation comprises four charts covering portions of Tierra del Fuego and southern Patagonia. Three charts extend northward from about 51.5°S to approx. 46.5°S, between approx. 72.7°W and 74.3°W. A fourth chart is laid out in an E-W orientation extending in Tierra del Fuego northward in southern Patagonia below the eastern end of the Strait of Magellan, roughly from Beagle Channel westward to Ballenero Channel (55.0°S/67.5°W to 54.5°S/70.5°W). Depicted within the area of these charts are the many glaciers and divers water bodies which make up the ice fields. The charts are based on aerial surveys of the region made in Jan.-Feb. 1947 by personnel of the USAF. The charts themselves were constructed in 1981.

51-3190

Primary production in antarctic sea ice.

Arrigo, K.R., Worthen, D.L., Lizotte, M.P., Dixon, P., Dieckmann, G., *Science,* Apr. 18, 1997, 276(5311), p.394-397, 16 refs.

Biomass, Algae, Sea ice, Snow depth, Mathematical models, Variations, Antarctica—Weddell Sea

A numerical model shows that in antarctic sea ice, increased flooding in regions with thick snow cover enhances primary production in the infiltration (surface) layer. Productivity in the freeboard (sea level) layer is also determined by sea ice porosity, which varies with temperature. Spatial and temporal variation in snow thickness and the proportion of first-year ice thus determine regional differences in sea ice primary production. Model results show that of the 40 teragrams of carbon produced annually in the antarctic ice pack, 75% was associated with first-year ice and nearly 50% was produced in the Weddell Sea. (Auth.)

51-3191

Reproductive biology of four species of *Pedicularis* (Scrophulariaceae) in West Greenland.

Philipp, M., Woodell, S.R.J., Böcher, J., Mattsson, O., *Arctic and alpine research,* Nov. 1996, 28(4), p.403-413, 41 refs.

Plant ecology, Plant physiology, Subpolar regions, Phenology, Sampling, Growth, Vegetation patterns, Pollen, Survival, Greenland

51-3192

Carbon storage and distribution in tundra soils of arctic Alaska, U.S.A.

Michaelson, G.J., Ping, C.L., Kimble, J.M., *Arctic and alpine research,* Nov. 1996, 28(4), p.414-424, 21 refs.

Arctic landscapes, Active layer, Tundra soils, Tundra vegetation, Permafrost transformation, Organic soils, Geochemical cycles, Cryoturbation, Vegetation patterns, Soil profiles, Soil analysis, Global warming, United States—Alaska

51-3193

Measuring and modeling stomatal and aerodynamic conductances of mountain birch: implications for treeline dynamics.

Holmgren, B., Ovhed, M., Karlsson, P.S., *Arctic and alpine research,* Nov. 1996, 28(4), p.425-434, 42 refs.

Forest ecosystems, Plant physiology, Vapor pressure, Evapotranspiration, Alpine landscapes, Forest lines, Growth, Mountain soils, Forest canopy, Photosynthesis, Statistical analysis

51-3194

Occurrence and consequences of grasshopper herbivory in an alpine grassland, Swiss Central Alps.

Blumer, P., Diemer, M., *Arctic and alpine research,* Nov. 1996, 28(4), p.435-440, 28 refs.

Plant ecology, Alpine landscapes, Meadow soils, Grasses, Biomass, Damage, Nutrient cycle, Geochemical cycles, Decomposition, Sampling, Statistical analysis, Switzerland—Alps

51-3195
Altitudinal variation in life cycles of carabid beetles: life-cycle strategy and colonization in alpine zones.
Sota, T., *Arctic and alpine research,* Nov. 1996, 28(4), p.441-447, 31 refs.
Alpine landscapes, Plant ecology, Ecosystems, Biomass, Distribution, Altitude, Migration, Cold weather survival, Sampling, Classifications, Seasonal variations, Statistical analysis

51-3196
Can ice sheets trigger abrupt climatic change.
Hughes, T., *Arctic and alpine research,* Nov. 1996, 28(4), p.448-465, 90 refs.
Glaciology, Pleistocene, Glaciation, Glacier oscillation, Climatic changes, Ice sheets, Air ice water interaction, Ice cover effect, Glacial meteorology, Wind factors, Ice age theory

51-3197
Field evidence for wet-based ice sheet erosion from the south-central Queen Elizabeth Islands, Northwest Territories, Canada.
Hättestrand, C., Stroeven, A.P., *Arctic and alpine research,* Nov. 1996, 28(4), p.466-474, 53 refs.
Glacial geology, Pleistocene, Ice sheets, Glacial erosion, Glacier flow, Orientation, Bedrock, Striations, Geomorphology, Quaternary deposits, Ice override, Ice solid interface, Canada—Northwest Territories—Queen Elizabeth Islands

51-3198
Late Wisconsin glacial history of the northern Alaska Peninsula, southwestern Alaska, U.S.A.
Stilwell, K.B., Kaufman, D.S., *Arctic and alpine research,* Nov. 1996, 28(4), p.475-487, 30 refs.
Pleistocene, Glaciation, Glacier oscillation, Glacial geology, Quaternary deposits, Radioactive age determination, Outwash, Stratigraphy, Moraines, Surface properties, Classifications, Correlation, Climatic factors, United States—Alaska—Brooks Lake

51-3199
Architecture of a modern push-moraine at Svalbard as inferred from ground-penetrating radar measurements.
Lønne, I., Lauritsen, T., *Arctic and alpine research,* Nov. 1996, 28(4), p.488-495, 38 refs.
Glacial geology, Moraines, Subsurface investigations, Radar echoes, Sounding, Profiles, Mapping, Soil structure, Geomorphology, Ice push, Permafrost structure, Ground ice, Shear flow, Norway—Svalbard

51-3200
Late Glacial climatic fluctuations in Ecuador: glacier retreat during Younger Dryas time.
Heine, K., Heine, J.T., *Arctic and alpine research,* Nov. 1996, 28(4), p.496-501, 29 refs.
Pleistocene, Climatology, Climatic changes, Mountain glaciers, Glacier oscillation, Glacier ablation, Moraines, Quaternary deposits, Radioactive age determination, Stratigraphy, Ecuador—Andes

51-3201
Avalanche climatology of Alyeska, Alaska, U.S.A.
Mock, C.J., *Arctic and alpine research,* Nov. 1996, 28(4), p.502-508, 33 refs.
Avalanche formation, Avalanche forecasting, Climatology, Climatic factors, Synoptic meteorology, Snow air interface, Snow mechanics, Atmospheric circulation, Snow water equivalent, Snow depth, Correlation, Seasonal variations, United States—Alaska

51-3202
Some characteristics of the climate in northern Alaska, U.S.A.
Zhang, T., Osterkamp, T.E., Stamnes, K., *Arctic and alpine research,* Nov. 1996, 28(4), p.509-518, 28 refs.
Climatology, Marine meteorology, Classifications, Ice heat flux, Freeze thaw cycles, Freezing points, Ice cover effect, Snow accumulation, Snow cover effect, Air temperature, Meteorological data, Correlation, Seasonal variations, Statistical analysis, United States—Alaska

51-3203
Composite correlation of cores and revised oxygen-isotope stratigraphy based on the whole-core magnetic susceptibility logs (ODP Site 645, Baffin Bay).
Hall, F.R., *Arctic and alpine research,* Nov. 1996, 28(4), p.519-523, 12 refs.
Marine geology, Bottom sediment, Stratigraphy, Isotope analysis, Oxygen isotopes, Drill core analysis, Sedimentation, Lithology, Magnetic properties, Correlation, Classifications, Canada—Baffin Bay

51-3204
Measurement of sediment color using the Colortron™ spectrophotometer.
Andrews, J.T., Freeman, W., *Arctic and alpine research,* Nov. 1996, 28(4), p.524-528, 15 refs.
Marine geology, Marine deposits, Spectroscopy, Photometry, Spectra, Optical properties, Drill core analysis, Light transmission, Standards, Accuracy

51-3205
Formation of the ice cover's flexural oscillations by action of surface and internal ship waves—part I. Surface waves.
Bukatov, A.E., Zharkov, V.V., *International journal of offshore and polar engineering,* Mar. 1997, 7(1), p.1-12, 50 refs.
Sea ice, Floating ice, Gravity waves, Wave propagation, Ice water interface, Flexural strength, Dynamic loads, Ice mechanics, Oscillations, Deformation, Mathematical models, Topographic features

51-3206
Structure of ice grown on high-voltage conductors.
Farzaneh, M., Bouillot, J., Teisseyre, Y., Svensson, E.C., Donaberger, R.L., *International journal of offshore and polar engineering,* Mar. 1997, 7(1), p.13-15, 10 refs. For another version see 50-208.
Power line icing, Ice accretion, Ice physics, Ice solid interface, Ice structure, Electric fields, Electric corona, Ice electrical properties, Polarization (charge separation), Simulation, Deuterium oxide ice, Neutron diffraction

51-3207
Indentation contact and penetration of ice by a semicircular indentor.
Veitch, B., Tuhkuri, J., *International journal of offshore and polar engineering,* Mar. 1997, 7(1), p.16-21, 29 refs. For another version see 51-2581.
Ice solid interface, Ice mechanics, Ice cutting, Penetration tests, Boundary value problems, Cracking (fracturing), Computerized simulation

51-3208
Origin of the first global meltwater pulse following the last glacial maximum.
Clark, P.U., Alley, R.B., Keigwin, L.D., Licciardi, J.M., Johnsen, S.J., Wang, H.X., *Paleoceanography,* Oct. 1996, 11(5), p.563-577, Refs. p.575-577.
Pleistocene, Paleoclimatology, Oceanography, Ice sheets, Ice volume, Glacier melting, Meltwater, Sea level, Isotope analysis, Glacier oscillation, Radioactive age determination, Glacier surges, Ice models

51-3209
Iceberg drift and decay model to compute the ice-rafted debris and iceberg meltwater flux: application to the interglacial North Atlantic.
Matsumoto, K., *Paleoceanography,* Oct. 1996, 11(5), p.729-742, 34 refs.
Pleistocene, Paleoclimatology, Ocean currents, Icebergs, Drift, Ice rafting, Sediment transport, Meltwater, Water transport, Air ice water interaction, Seasonal variations, Ice models, Atlantic Ocean

51-3210
Snow cover characterization using multiband FMCW radars.
Koh, G., Yankielun, N.E., Baptista, A.I., MP 4009, *Hydrological processes,* 1996, Vol.10, p.1609-1617, 7 refs.
Snow surveys, Snow cover structure, Remote sensing, Airborne radar, Radio echo soundings, Depth hoar, Ice detection, Grain size, Snow crystal structure, Profiles, Freeze thaw cycles, Metamorphism (snow)

A promising radar technique for snow cover studies is the frequency modulated continuous wave (FMCW) radar. The use of a multiband radar approach for snow cover studies was investigated in order to fully exploit the capabilities of FMCW radars. FMCW radars were used to obtain radar profiles over a wide range of snow cover conditions. These frequency-dependent radar signatures were used to identify important snow cover features such as ice and depth hoar layers. Snow grain size information was also obtained from the frequency-dependent scattering losses that were observed in the snow cover. Several case studies of FMCW radar profiles are presented in order to demonstrate the advantages of a multiband radar approach for monitoring the spatial and temporal variability of snow cover properties and/or processes over an extended area. (Auth. mod.)

51-3211
Determination of surface turbulent fluxes over leads in arctic sea ice.
Alam, A., Curry, J.A., *Journal of geophysical research,* Feb. 15, 1997, 102(C2), p.3331-3343, 42 refs.
Oceanography, Ice openings, Turbulent boundary layer, Air water interactions, Turbulent diffusion, Heat flux, Ice cover effect, Sea states, Surface roughness, Mathematical models, Wind factors, Arctic Ocean

51-3212
Physical, structural, and isotopic characteristics and growth processes of fast sea ice in Lützow-Holm Bay, Antarctica.
Kawamura, T., Ohshima, K.I., Takizawa, T., Ushio, S., *Journal of geophysical research,* Feb. 15, 1997, 102(C2), p.3345-3355, 41 refs.
Oceanography, Sea ice, Ice cover thickness, Fast ice, Ice growth, Ice structure, Ice composition, Isotope analysis, Snow cover effect, Snow ice interface, Snowmelt, Seasonal variations, Antarctica—Lützow-Holm Bay

A sea-ice/ocean study was conducted off Queen Maud Land and Enderby Land from 1990 to 1991 by the Japanese Antarctic Research Expedition. Observations of multiyear land fast sea ice were made in Lützow-Holm Bay over a period of 2 years to determine the snow and ice characteristics and ice growth processes. The snow depth in the bay reached large values of 1.0 to 1.5 m during the winter season at offshore locations. From the analysis of ice thickness measurements, it is confirmed that the fast ice with deep snow cover grew little in winter but substantially thickened during the summer months. It is concluded that the summer growth was caused by upward growth at the top of the ice to which snow ice and superimposed ice formation contribute. These processes were the primary contributors to sea-ice growth and characteristics only where the snow accumulation was large. In areas of low snow accumulation, there was no surface growth. Superimposed ice formation on sea ice in Antarctica has not been reported previously. (Auth. mod.)

51-3213
Laboratory study of the effect of frost flowers on C band radar backscatter from sea ice.
Nghiem, S.V., Martin, S., Perovich, D.K., Kwok, R., Drucker, R., Gow, A.J., MP 4010, *Journal of geophysical research,* Feb. 15, 1997, 102(C2), p.3357-3370, 13 refs.
Sea ice, Young ice, Surface structure, Ice crystal growth, Dendritic ice, Ice needles, Slush, Synthetic aperture radar, Radar photography, Backscattering, Ice optics, Ice cover effect, Brightness, Simulation

C band images of arctic sea ice taken by synthetic aperture radar show transitory regions of enhanced radar backscatter from young sea ice. Published field observations associate this increase with frost flower growth and the capture of blowing snow by the flowers. Laboratory experiments were conducted on the response of C band radar backscatter to frost flowers growing on the surface of newly formed saline ice. The experiment took place in a 5 m by 7 m by 1.2 m deep saline water pool located in a two-story indoor refrigerated facility at the Cold Regions Research and Engineering Laboratory. Sodium chloride ice was grown in this pool at an air temperature of -28°C. The frost flowers first appeared on the ice surface as dendrites and then changed to needles as the ice sheet grew thicker and the surface temperatures became colder. Far-field radar measurements of the backscatter from the ice were made at incident angles from 20° to 40° and at approximately 6-hour intervals throughout the 3-day period of the experiment. A backscatter minimum occurred early in the flower growth at the time coincident with an abrupt doubling in the ice surface salinity. Crystal flowers have little impact on the backscatter, while the underlying slush patches yield a backscatter increase of 3-5 dB over that of bare ice. The laboratory results that this relative backscatter increase of approximately 5 dB can be used as an index to mark the full areal coverage of frost flowers.

51-3214

Impact of eastern arctic shelf waters on the Nansen Basin intermediate layers.

Schauer, U., Muench, R.D., Rudels, B., Timokhov, L., *Journal of geophysical research*, Feb. 15, 1997, 102(C2), p.3371-3382, 45 refs.

Oceanographic surveys, Ocean currents, Hydrography, Profiles, Water temperature, Salinity, Stratification, Ventilation, Turbulent diffusion, Boundary layer, Buoyancy, Barents Sea, Russia—Laptev Sea

51-3215

Nitrous oxide in the Bellingshausen Sea and Drake Passage.

Rees, A.P., Owens, N.J.P., Upstill-Goddard, R.C., *Journal of geophysical research*, Feb. 15, 1997, 102(C2), p.3383-3391, 45 refs.

Oceanographic surveys, Hydrography, Climatic factors, Sea water, Water chemistry, Ice cover effect, Atmospheric composition, Gases, Aerosols, Air water interactions, Turbulent diffusion, Upwelling, Sampling, Antarctica—Bellingshausen Sea, —Drake Passage

Concentrations of dissolved and atmospheric nitrous oxide, N_2O, were measured in the austral spring of 1992 in the Drake Passage and Bellingshausen Sea, as part of the United Kingdom Joint Global Ocean Flux Study expedition to the southern ocean. In the Drake Passage, surface N_2O saturations were generally very close to atmospheric equilibrium, although several anomalous points were associated with the presence of frontal and eddy-like features within the Antarctic Polar Frontal Zone and at the Continental Water Boundary. Other observations reflect upwelling of Circumpolar Deep Water at approximately 70°S, resulting in the accumulation of N_2O under the winter sea ice and its subsequent release to the atmosphere following the ice retreat. North of the upwelling region, Antarctic Surface Water formed from the mixing of surface waters and ice melt was moderately depleted in N_2O with respect to the atmosphere, a minimum 90% of saturation. (Auth. mod.)

51-3216

Boundary undercurrent and water mass changes in the Lincoln Sea.

Newton, J.L., Sotirin, B.J., *Journal of geophysical research*, Feb. 15, 1997, 102(C2), p.3393-3403, 19 refs.

Oceanographic surveys, Ocean currents, Velocity measurement, Water structure, Classifications, Hydrography, Boundary layer, Profiles, Ice shelves, Water transport, Advection, Lincoln Sea

51-3217

Mechanisms for surface ozone depletion and recovery during polar sunrise.

Gong, S.L., Walmsley, J.L., Barrie, L.A., Hopper, J.F., *Atmospheric environment*, Apr. 1997, 31(7), p.969-981, 32 refs.

Atmospheric boundary layer, Climatology, Polar atmospheres, Atmospheric composition, Profiles, Ozone, Degradation, Advection, Turbulent diffusion, Snow air interface, Ice cover effect, Wind factors

51-3218

***Galileo* explores Jupiter's satellites.** *Geotimes*, Oct. 1996, 41(10), p.12-14.

Spacecraft, Satellites (natural), Extraterrestrial ice, Ice detection, Spaceborne photography, Regolith, Geologic processes, Ice mechanics, Topographic features, Tectonics

51-3219

Peculiarities of fluctuations in supercooled water.

Lokotosh, T.V., Magazu, S., Maisano, G., Malomuzh, N.P., *Journal of molecular structure*, Jan. 20, 1997, 403(1-2), p.143-152, 29 refs.

Water structure, Supercooling, Liquid cooling, Molecular structure, Anisotropy, Hydrogen bonds, Hydrodynamics, Phase transformations, Spectroscopy, Spectra, X ray analysis, Light scattering, Thermodynamic properties, Analysis (mathematics)

51-3220

Water vapor distribution in the arctic atmosphere in clear and overcast sky conditions.

Burova, L.P., Lukianchikova, N.I., *Russian meteorology and hydrology*, 1996, No.1, p.25-31, Translated from Meteorologiia i gidrologiia. 4 refs.

Climatology, Polar atmospheres, Atmospheric boundary layer, Atmospheric composition, Water vapor, Distribution, Humidity, Cloud cover, Atmospheric density, Stratification, Sounding, Statistical analysis, Seasonal variations

51-3221

Topsoil (0-5 cm) composition in eight arctic catchments in northern Europe (Finland, Norway and Russia).

Reimann, C., et al, *Environmental pollution*, Mar. 14, 1997, 95(1), p.45-56, 27 refs.

Frozen ground chemistry, Geochemistry, Tundra soils, Taiga, Soil pollution, Air pollution, Snow impurities, Aerosols, Metals, Sampling, Lithology, Soil tests, Mining, Statistical analysis, Environmental tests, Russia, Finland, Norway

51-3222

On the sensitivity of hail accretion rates in numerical modeling.

Curić, M., Janc, D., *Tellus*, Jan. 1997, 49A(1), p.100-107, 30 refs.

Precipitation (meteorology), Cloud physics, Hailstone growth, Ice accretion, Icing rate, Snow pellets, Ice water interface, Mathematical models, Spectra

51-3223

Comparison of glycolytic activity in winter wheat and two forage grasses in relation to their tolerance to ice encasement.

Andrews, C.J., *Annals of botany*, Jan. 1997, 79(suppl.A), p.87-91, 23 refs.

Agriculture, Plant physiology, Cold tolerance, Icing, Grasses, Flooding, Acclimatization, Ice solid interface, Ice cover effect, Low temperature tests

51-3224

Survival and metabolite accumulation by seedlings and mature plants of timothy grass during ice encasement.

Gudleifsson, B.E., *Annals of botany*, Jan. 1997, 79(suppl.A), p.93-96, 20 refs.

Plant ecology, Plant physiology, Grasses, Cold weather survival, Acclimatization, Icing, Damage, Ice cover effect, Simulation

51-3225

Global model estimates of carbon and nitrogen storage in litter and soil pools: response to changes in vegetation quality and biomass allocation.

Potter, C.S., Klooster, S.A., *Tellus*, Feb. 1997, 49B(1), p.1-17, Refs. p.14-17.

Ecosystems, Global warming, Atmospheric composition, Carbon dioxide, Storage, Geochemical cycles, Plant tissues, Organic soils, Decomposition, Biomass, Tundra soils, Tundra climate, Vegetation factors, Models

51-3226

Linking a global terrestrial biogeochemical model and a 2-dimensional climate model: implications for the global carbon budget.

Xiao, X., Kicklighter, D.W., Melillo, J.M., McGuire, A.D., Stone, P.H., Sokolov, A.P., *Tellus*, Feb. 1997, 49B(1), p.18-37, Refs. p.35-37.

Climatology, Climatic changes, Atmospheric composition, Carbon dioxide, Global change, Forest ecosystems, Biomass, Plant ecology, Geochemical cycles, Alpine tundra, Tundra vegetation, Tundra soils, Mathematical models, Statistical analysis

51-3227

SNOSP: ion deposition and concentration in high alpine snow packs.

Nickus, U., et al, *Tellus*, Feb. 1997, 49B(1), p.56-71, 20 refs.

Snow surveys, Sampling, Alpine landscapes, Snow composition, Air pollution, Aerosols, Snow impurities, Chemical analysis, Ion density (concentration), Ion diffusion, Profiles, Seasonal variations, Statistical analysis, Environmental tests

51-3228

On the transport of trace elements into Antarctica using measurements at the Georg-von-Neumayer Station.

Wyputta, U., *Tellus*, Feb. 1997, 49B(1), p.93-111, 31 refs.

Polar atmospheres, Atmospheric composition, Marine atmospheres, Sampling, Aerosols, Ozone, Atmospheric circulation, Wind direction, Wind factors, Turbulent diffusion, Seasonal variations, Statistical analysis, Antarctica—Georg von Neumayer Station

Origin and transport of ^{222}Rn, surface ozone, and sea salt measured at the German antarctic research station Georg von Neumayer (GvN) were investigated together with local meteorological observations and calculated 2-dimensional trajectories. Nearly 92% of all trajectories calculated at the 850 hPa level and 97% on the 925 hPa surface indicate easterly flows due to orographic effects of the antarctic continent. In addition, time series of trace elements measured at GvN were analyzed together with local meteorological data and the trajectories to find the source regions of the trace elements. Primary results are that periods with high radon-222 concentrations are mostly connected to cyclones approaching from the South American continent. Most of the maxima of surface ozone and sea salt are also well correlated with cyclonic activities near the antarctic continent. (Auth. mod.)

51-3229

Methane flux from northern wetlands and tundra—an ecosystem source modelling approach.

Christensen, T.R., Prentice, I.C., Kaplan, J., Haxeltine, A., Sitch, S., *Tellus*, Nov. 1996, 48B(5), p.652-661, Refs. p.659-661.

Climatology, Atmospheric composition, Soil air interface, Vapor transfer, Natural gas, Tundra climate, Tundra soils, Wetlands, Ecosystems, Photosynthesis, Biomass, Mathematical models, Seasonal variations, Geochemical cycles

51-3230

Simulation and analysis of frost heaving in subsoils and granular fills of roads.

Padilla, F., Villeneuve, J.P., Stein, J., *Cold regions science and technology*, Mar. 1997, 25(2), p.89-99, 21 refs.

Frozen ground mechanics, Frost heave, Pavement bases, Earth fills, Subgrade soils, Water table, Soil tests, Mechanical tests, Bearing strength, Deformation, Simulation, Physical properties, Forecasting

51-3231

Soil freezing—the concept of soil water potential. State of the art.

Hohmann-Porebska, M., *Cold regions science and technology*, Mar. 1997, 25(2), p.101-110, 40 refs.

Soil freezing, Frozen ground mechanics, Frost heave, Ice lenses, Phase transformations, Ice water interface, Water pressure, Thermodynamic properties, Soil water migration, Theories, Mathematical models

51-3232

Movement of liquid contaminants in partially saturated frozen granular soils.

Wiggert, D.C., Andersland, O.B., Davies, S.H., *Cold regions science and technology*, Mar. 1997, 25(2), p.111-117, 7 refs.

Hydrogeology, Frozen ground chemistry, Permafrost hydrology, Soil tests, Soil freezing, Soil pollution, Sealing, Environmental protection, Soil water migration, Saturation, Mass transfer, Permeability, Sands, Environmental protection, Simulation

51-3233

Complex dielectric constant of ice at 1.8 GHz.

Koh, G., MP 4011, *Cold regions science and technology*, Mar. 1997, 25(2), p.119-121, 6 refs.

Remote sensing, Ice physics, Ice dielectrics, Dielectric properties, Microwaves, Optical absorption, Ice optics, Refractivity, Simulation

The complex dielectric constant of bubble-free ice grown from deionized water was determined at 1.8 GHz using an interference technique. The interference pattern was produced by measuring the reflected signals from bubble-free ice slabs of varying thickness at normal incident angle. The wavelength and loss factor in the bubble-free ice samples were obtained from the resulting interference pattern. The real and imaginary components of the dielectric constant were determined to be 3.17 and 0.003, respectively. (Auth.)

51-3234

Monitoring the dry density and the liquid water content of snow using time domain reflectometry (TDR).

Stein, J., Laberge, G., Lévesque, D., *Cold regions science and technology*, Mar. 1997, 25(2), p.123-136, 35 refs.

Snow physics, Electrical measurement, Wet snow, Snow hydrology, Water content, Snow density, Dielectric properties, Sampling, Probes, Microwaves, Accuracy, Avalanche forecasting, Runoff forecasting

51-3235

Simulated climate change effects on ice and snow cover on lakes in a temperate region.

Stefan, H.G., Fang, X., *Cold regions science and technology,* Mar. 1997, 25(2), p.137-152, 31 refs.

Climatic changes, Global warming, Limnology, Lake ice, Snow cover, Ice formation, Seasonal freeze thaw, Freezeup, Water temperature, Ice cover thickness, Snow depth, Bottom sediment, Heat flux, Ice water interface, Snow air interface, Simulation, Mathematical models

51-3236

Creating initial cracks for interfacial fracture of ice.

Whelan, A.E., Nixon, W.A., *Cold regions science and technology,* Mar. 1997, 25(2), p.153-157, 7 refs.

Ice mechanics, Mechanical tests, Ice solid interface, Ice adhesion, Substrates, Ice strength, Ice cracks, Cracking (fracturing), Crack propagation, Simulation, Laboratory techniques

51-3237

Full Moon warns of icy wastes.

Pearce, F., *New scientist,* Jan. 11, 1997, 153(2064), p.15.

Polar atmospheres, Air temperature, Heat transfer, Atmospheric circulation, Wind factors, Gravity, Tides, Satellites (natural), Climatic factors

Satellite data have revealed that temperatures in the polar regions of both northern and southern hemispheres fluctuate markedly with the waxing and waning of the Moon. According to members of the Department of Geography and Office of Climatology at Arizona State University in Tempe, average temperatures in the Arctic and Antarctic are more than 0.55°C higher around the full Moon than at the new Moon. The cause appears to be a strong transfer of heat in the atmosphere towards the poles, possibly caused by the greater tidal pull of a full Moon changing wind patterns. (Auth. mod.)

51-3238

Performance of a differential optical absorption spectrometer for surface O_3 measurements in the Finnish Arctic.

Virkkula, A., *Atmospheric environment,* Feb. 1997, 31(4), p.545-555, 17 refs.

Climatology, Atmospheric composition, Subpolar regions, Optical absorption, Spectroscopy, Ozone, Atmospheric boundary layer, Diurnal variations, Statistical analysis, Correlation, Performance, Visibility, Finland

51-3239

Intelligent distributed heater used for industrial applications.

Sandberg, C., Whitney, W., Nassar, A., Kuse, G., IEEE International Conference on Systems, Man and Cybernetics, Vancouver, British Columbia, Canada, Oct. 22-25, 1995. Proceedings, Volume 4. Intelligent systems for the 21st century, Piscataway, Institute of Electrical and Electronics Engineers, 1995, p.3346-3351, 4 refs.

DLC TA168.I19

Electric heating, Transmission lines, Polymers, Cryogenics, Liquefied gases, Storage tanks, Pipeline heating, Frost heave, Frost resistance, Countermeasures, Electrical resistivity, Performance

51-3240

Summary of science results from Spaceborne Imaging Radar (SIR-C/X-SAR).

Plaut, J.J., IEEE Aerospace Applications Conference, Aspen, CO, Feb. 3-10, 1996. Proceedings, vol.2., Piscataway, Institute of Electrical and Electronics Engineers, 1996, p.19-26, 46 refs.

DLC TL3000.A1 I18a

Airborne radar, Spaceborne photography, Synthetic aperture radar, Geophysical surveys, Hydrologic cycle, Snow surveys, Glacier surveys, Ecosystems, Performance

51-3241

Expert system to support snow avalanche forecasting.

Joseph, S.W., Lakeman, G.P., IEEE International Conference on Systems, Man and Cybernetics, Vancouver, British Columbia, Canada, Oct. 22-25, 1995. Proceedings, Volume 3. Intelligent systems for the 21st century, Piscataway, Institute of Electrical and Electronics Engineers, 1995, p.2434-2439, 7 refs.
DLC TA168.I19

Avalanche forecasting, Snow mechanics, Computer programs, Computer applications, Computerized simulation, Snow cover structure, Profiles, Physical properties, Statistical analysis

51-3242

Cellular automata modeling of snow transport by wind.

Masselot, A., Chopard, B., International Workshop on Applied Parallel Computing in Physics, Chemistry and Engineering Science, 2nd, Lyngby, Denmark, Aug. 21-24, 1995. Proceedings. PARA '95, Heidelberg, Springer-Verlag, 1996, p.429-435, 4 refs.
DLC QA76.58.P35

Snow physics, Fluid dynamics, Blowing snow, Snow erosion, Topographic effects, Computerized simulation, Computer programs, Snow air interface, Turbulent boundary layer, Statistical analysis, Data processing, Wind factors

51-3243

Snowfall and rainfall forecasting from weather radar images with artificial neural networks.

Ochiai, K., Suzuki, H., Shinozawa, K., Fujii, M., Sonehara, N., IEEE International Conference on Neural Networks, Perth, Australia, Nov. 27-Dec. 1, 1995. Proceedings, Volume 2, Piscataway, Institute of Electrical and Electronics Engineers, 1995, p.1182-1187, 4 refs.
DLC QA76.87.I3437

Weather forecasting, Image processing, Radar photography, Snowfall, Precipitation (meteorology), Computer applications, Computer programs, Data processing, Accuracy

51-3244

Biogenic bromine production in the Arctic.

Cota, G.F., Sturges, W.T., *Marine chemistry,* Mar. 1997, 56(3-4), p.181-192, 20 refs.

Oceanography, Marine biology, Atmospheric composition, Sea ice, Bottom ice, Algae, Microbiology, Ice composition, Ecosystems, Biomass, Vapor transfer, Ice water interface, Sampling, Canada—Northwest Territories—Resolute Bay

51-3245

Oxygen isotope studies from Iceland to an East Greenland fjord: behaviour of glacial meltwater plume.

Azetsu-Scott, K., Tan, F.C., *Marine chemistry,* Mar. 1997, 56(3-4), p.239-251, 44 refs.

Oceanography, Water chemistry, Ocean currents, Isotope analysis, Oxygen isotopes, Profiles, Glacier melting, Meltwater, Turbulent diffusion, Ocean currents, Classifications, Boundary layer

51-3246

Changes in glacier and alpine runoff in the North Cascade Range, Washington, USA 1985-1993.

Pelto, M.S., *Hydrological processes,* Sep. 1996, 10(9), p.1173-1180, 12 refs.

Glacial hydrology, Glacier surveys, Alpine glaciation, Mountain glaciers, Glacier oscillation, Climatic changes, Snowmelt, Runoff, Stream flow, Hydrography, Seasonal variations, United States—Washington—North Cascade Range

51-3247

Growth and freezing tolerance of winterfat seedlings.

Hou, J.Q., Romo, J.T., *Journal of range management,* Mar. 1997, 50(2), p.165-169, 21 refs.

Plant ecology, Ecosystems, Plains, Trees (plants), Cold tolerance, Frost resistance, Cold weather survival, Temperature effects, Revegetation, Growth

51-3248

Numerical analysis of mire margin forest vegetation in south and central Finland.

Korpela, L., Reinikainen, A., *Annales botanici Fennici,* 1996, 33(3), p.183-197, Refs. p.192-197.

Forest ecosystems, Plant ecology, Vegetation patterns, Wetlands, Subarctic landscapes, Paludification, Forest lines, Classifications, Statistical analysis, Finland

51-3249

Harmonic dynamics in supercoooled liquids: the case of water.

Sciortino, F., Tartaglia, P., *Physical review letters,* Mar. 24, 1997, 78(12), p.2385-2388, 29 refs.

Liquid cooling, Supercooling, Water structure, Molecular energy levels, Oscillations, Spectra, Stability, Temperature effects

51-3250

Comment on "Cauchy relation in dense H_2O ice VII".

Brazhkin, V.V., Liapin, A.G., *Physical review letters,* Mar. 24, 1997, 78(12), p.2493, 8 refs. For pertinent paper see 49-4869.

Ice physics, High pressure ice, Cubic ice, Molecular energy levels, Ice elasticity, Spectroscopy

51-3251

Sub-grid-scale topography and the simulation of northern hemisphere snow cover.

Walland, D.J., Simmonds, I., *International journal of climatology,* Sep. 1996, 16(9), p.961-982, 38 refs.

Climatology, Snow surveys, Snow hydrology, Snow cover distribution, Snow depth, Seasonal variations, Topographic effects, Spaceborne photography, Mathematical models, Simulation, Forecasting

51-3252

New spatial synoptic classification: application to air-mass analysis.

Kalkstein, L.S., Nichols, M.C., Barthel, C.D., Greene, J.S., *International journal of climatology,* Sep. 1996, 16(9), p.983-1004, 44 refs.

Synoptic meteorology, Climatology, Atmospheric circulation, Air masses, Classifications, Snow cover effect, Snow air interface, Air temperature, Temperature variations, Statistical analysis, Weather observations

51-3253

Historical snow cover variability in the Great Plains regions of the USA: 1910 through to 1993.

Hughes, M.G., Robinson, D.A., *International journal of climatology,* Sep. 1996, 16(9), p.1005-1018, 25 refs.

Snow surveys, Snow cover distribution, Snow cover effect, Plains, Climatic changes, Air temperature, Meteorological factors, Seasonal variations, Statistical analysis, United States—Great Plains

51-3254

Clo: a utilitarian unit to measure weather/climate comfort.

Yan, Y.Y., Oliver, J.E., *International journal of climatology,* Sep. 1996, 16(9), p.1045-1056, 33 refs.

Weather observations, Clothing, Classifications, Thermal stresses, Thermal insulation, Cold weather performance, Wind chill, Indexes (ratios), Standards

51-3255

Nucleation of splitting cracks in columnar freshwater ice.

Gupta, V., Picu, R.C., Bergström, J.S., *Acta materialia,* Apr. 1997, 45(4), p.1411-1423, 12 refs.

Ice mechanics, Mechanical tests, Ice solid interface, Ice microstructure, Static loads, Crack propagation, Ice cracks, Nucleation, Brittleness, Stress concentration, Sliding, Tensile properties

51-3256

Boundary layer transport of metal ions in frozen soil.

Mohamed, A.M.O., Shooshpasha, I., Yong, R.N., *International journal for numerical and analytical methods in geomechanics,* Oct. 1996, 20(10), p.693-713, 22 refs.

Frozen ground chemistry, Boundary layer, Clay soils, Sealing, Soil freezing, Ion diffusion, Metals, Soil water migration, Permafrost transformation, Mechanical tests, Unfrozen water content, Leaching, Analysis (mathematics), Environmental tests

51-3257

Unsupervised classification of antarctic satellite imagery using Kohonen's self-organising feature map.

Kilpatrick, D., Williams, R., IEEE International Conference on Neural Networks, Perth, Australia, Nov. 27-Dec. 1, 1995. Proceedings, Volume 1, Piscataway, Institute of Electrical and Electronics Engineers, 1995, p.32-36, 10 refs.

DLC QA76.87.I3437

Spaceborne photography, Radiometry, Geophysical surveys, Sea ice distribution, Ice surveys, Classifications, Image processing, Computer applications, Computer programs, Data processing, Antarctica—Vincennes Bay

This paper describes an investigation into the use of Kohonen's Self-Organising Feature Map (SOM) for the classification of remotely sensed imagery of Antarctica. The SOM is an unsupervised neural network which is trained using unlabelled input data. The network consists of a grid of nodes and, after training, each node corresponds to a prototype vector in the input data space. In order to use the trained SOM as an image classifier it is necessary to calibrate the grid of prototype vectors whereby the prototype vectors are clustered and these clusters mapped to physical class labels. The K-means iterative clustering technique is demonstrated as a means of performing this clustering. (Auth. mod.)

51-3258

Vegetation patterns in relation to climatic and endogenous changes in Wilkes Land, continental Antarctica.

Melick, D.R., Seppelt, R.D., *Journal of ecology,* Feb. 1997, 85(1), p.43-56, 35 refs.

Plant ecology, Biogeography, Climatic changes, Climatic factors, Air temperature, Soil temperature, Vegetation patterns, Ecosystems, Lichens, Seasonal variations, Microclimatology, Antarctica—Wilkes Land

The present paper summarizes five years of experiments and field observations which examine the status of the Windmill Is. flora and the likely contributions of climatic and endogenous changes to altering the plant communities. Seral stages of mixed bryophyte and lichen communities are identified and correlated with environmental factors. Since environmental conditions in Antarctica vary enormously over the year, microclimate data measured over a 4-year period are related to the distribution and dynamics of significant plant species—the time available for growth of major moss and lichen species are estimated and the recovery potential of lichenized mosses are examined. Recent climatic trends in the Windmill Is. are determined from analyses of available meteorological records. The possible timescales of plant successions are also examined in the light of glaciological and geomorphological evidence of long-term environmental change in this region. (Auth. mod.)

51-3259

Dendritic ice crystals with faceted tip growing from the vapor phase.

Gonda, T., Nakahara, S., *Journal of crystal growth,* Mar. 1997, 173(1-2), p.189-193, 9 refs.

Ice physics, Snow crystal growth, Dendritic ice, Ice microstructure, Ice crystal structure, Ice vapor interface, Ice water interface, Supersaturation, Structural analysis, Scanning electron microscopy

51-3260

Atmospheric signatures in sea-ice concentration estimates from passive microwaves: modelled and observed.

Oelke, C., *International journal of remote sensing,* Mar. 20, 1997, 18(5), p.1113-1136, 33 refs.

Marine meteorology, Remote sensing, Radiometry, Sea ice distribution, Ice surveys, Classifications, Cloud cover, Radio echo soundings, Air temperature, Water vapor, Climatic factors, Ice cover effect, Accuracy

51-3261

Reconstruction of palaeo-ice sheets: the use of geomorphological data.

Kleman, J., Borgström, I., *Earth surface processes and landforms,* Oct. 1996, 21(10), p.893-909, Refs. p.907-909.

Pleistocene, Glacial geology, Ice sheets, Geomorphology, Landforms, Landscape development, Terrain identification, Models, Glacier flow, Meltwater, Outwash, Geochronology, Correlation

51-3262

Boron isotopic composition of tourmalines from the 3.8-Ga-old Isua supracrustals, West Greenland: implications on the $\delta^{11}B$ value of early Archean seawater.

Chaussidon, M., Appel, P.W.U., *Chemical geology,* Apr. 25, 1997, 136(3-4), p.171-180, 35 refs.

Geological surveys, Pleistocene, Marine geology, Subpolar regions, Earth crust, Marine deposits, Magma, Isotope analysis, Sea water, Geochemistry, Greenland—Isua

51-3263

Fire severity and vegetation response in the boreal Swedish forest.

Schimmel, J., Granström, A., *Ecology,* July 1996, 77(5), p.1436-1450, Refs. p.1448-1450.

Subarctic landscapes, Forest ecosystems, Revegetation, Forest fires, Organic soils, Damage, Soil tests, Sampling, Soil temperature, Sweden

51-3264

Availability of iron to *Pseudomonas fluorescens* in rhizosphere and bulk soil evaluated with an ice nucleation reporter gene.

Loper, J.E., Henkels, M.D., *Applied and environmental microbiology,* Jan. 1997, 63(1), p.99-105, 39 refs.

Soil microbiology, Soil tests, Roots, Nutrient cycle, Sensors, Bacteria, Ice nuclei, Heterogeneous nucleation, Stability, Indicating instruments

51-3265

Extreme preformation in alpine *Polygonum viviparum*: an architectural and developmental analysis.

Diggle, P.K., *American journal of botany,* Feb. 1997, 84(2), p.154-169, 72 refs.

Plant physiology, Alpine landscapes, Tundra vegetation, Grasses, Biomass, Plant tissues, Modification, Scanning electron microscopy, Structural analysis, Cold weather survival, Viability

51-3266

Effect of day length on germination of seeds collected in Alaska.

Densmore, R.V., *American journal of botany,* Feb. 1997, 84(2), p.274-278, 19 refs.

Plant ecology, Plant physiology, Growth, Tundra vegetation, Taiga, Light effects, Insolation, Phenology, Simulation

51-3267

Formation and forecasting of condensation trails behind modern aircraft.

Ferris, P.D., *Meteorological applications,* Dec. 1996, 3(4), p.301-306, 5 refs.

Condensation trails, Cloud physics, Atmospheric composition, Water vapor, Ice nuclei, Heterogeneous nucleation, Ice formation, Forecasting, Visibility, Mathematical models

51-3268

Seasonal changes in the physical state of crown water associated with freezing tolerance in winter wheat.

Yoshida, M., Abe, J., Moriyama, M., Shimokawa, S., Nakamura, Y., *Physiologia plantarum,* Mar. 1997, 99(3), p.363-370, 32 refs.

Plant physiology, Grasses, Desiccation, Frost resistance, Cold tolerance, Snow cover effect, Acclimatization, Plant tissues, Water content, Cold weather tests, Seasonal variations

51-3269

Antifreeze protein accumulation in freezing-tolerant cereals.

Antikainen, M., Griffith, M., *Physiologia plantarum,* Mar. 1997, 99(3), p.423-432, 37 refs.

Plant physiology, Grasses, Plant tissues, Frost resistance, Ice formation, Cold tolerance, Acclimatization, Antifreezes, Temperature effects, Simulation

51-3270

Ice-core records of atmospheric sulphur.

Legrand, M., *Royal Society of London. Philosophical transactions. Series B,* Feb. 28, 1997, 352(1350), p.241-250, 38 refs.

Climatology, Atmospheric composition, Air pollution, Ice sheets, Ice cores, Profiles, Snow impurities, Aerosols, Geochemical cycles, Environmental tests, Periodic variations, Correlation, Greenland, Antarctica

Sulphate and methanesulphonate (MSA), the two major sulphur species trapped in polar ice, have been extensively studied in antarctic and Greenland ice cores spanning the last centuries as well as the entire last climatic cycle. Data from the cores are used to investigate the past contribution of volcanic and biogenic emissions to the natural sulphur budget in high latitude regions of both hemispheres. Sulphate concentrations in polar ice very often increased during one or two years after large volcanic eruptions. Sulphate records show that fossil fuel combustion has enhanced sulphate concentrations in Greenland snow by a factor of four since the beginning of this century, and that no similar trend has occurred in Antarctica. At present, sulphate in antarctic snow is mainly marine and biogenic in origin and the rate of dimenthyl sulphide (DMS) emissions may have been enhanced during past developments of El Niño Southern Oscillations (ENSO). Long-term variations in Greenland cores are opposite in sign to those revealed by antarctic ice cores. Such a difference suggests that climate changes led to a quite different sulphur cycle response in the two hemispheres. (Auth. mod.)

51-3271

Expanding a numerical dynamic-thermodynamic sea ice model toward the understanding of ice deformation. [Erweiterung eines numerischen dynamisch-thermodynamischen Meereismodells zur Erfassung deformierten Eises]

Harder, M., *Alfred-Wegener-Institut für Polar- und Meeresforschung. Report in the physical sciences,* Feb. 1994, No.50, 145p., In German. 42 refs.

Sea ice distribution, Ice deformation, Mathematical models, Thermodynamic properties, —South Atlantic Ocean, Antarctica—Weddell Sea

In eight sections overall descriptions are given of the model, how it operates, what problems were encountered, and what resolutions were woven into the plan. The sea ice model is regarded as part of climate research and its thermodynamic import receives full emphasis in such aspects as sea ice flowing, melting, ridging, rafting, and energy balance. The model was broadened to include flow trajectory, mathematical schemes and stimulus functions are described, and adjustments to the model parameters were incorporated. Simulated results were examined, compared with observations, and further adjustments were made. In Section 8, eight separate variations and sensitivity studies are presented and discussed. In the final section the entire project is summarized and prospects of its success are offered.

51-3272

Predictability of North Atlantic multidecadal climate variability.

Griffies, S.M., Bryan, K., *Science,* Jan. 10, 1997, 275(5297), p.181-184, 19 refs.

Climatic changes, Variations, Water temperature, Boundary value problems, Sea water, Surface temperature, North Atlantic Ocean

51-3273

Crustal deformation from 1992 to 1995 at the Mid-Atlantic Ridge, southwest Iceland, mapped by satellite radar interferometry.

Vadon, H., Sigmundsson, F., *Science,* Jan. 10, 1997, 275(5297), p.193-197, 29 refs.

Earth crust, Deformation, Radar, Remote sensing, Iceland

51-3274

Time for the arctic science submarine is now.

Newton, G.B., *U.S. Naval Institute. Proceedings,* Dec. 1992, 118(12), p.102-105.

Submarines, Subglacial observations, Nuclear power, Oceanographic surveys, Construction, Research projects, Arctic Ocean

51-3275

Transition from the Younger Dryas to the Preboreal: a case study from the Kattegat, Scandinavia.

Jiang, H., Klingberg, F., *Boreas,* Dec. 1996, 25(4), p.271-282, 48 refs.

Paleoclimatology, Climatic changes, Global warming, Oceanography, Water temperature, Marine deposits, Quaternary deposits, Drill core analysis, Paleoecology, Lithology, Glacier melting, Meltwater, Correlation, Sweden—Kattegat

51-3276

Ferdynandovian Interglacial climate reconstructions from pollen successions, stable-isotope composition and magnetic susceptibility.

Krzyszkowski, D., Böttger, T., Junge, F.W., Kuszell, T., Nawrocki, J., *Boreas,* Dec. 1996, 25(4), p.283-296, 48 refs.

Paleoclimatology, Lacustrine deposits, Quaternary deposits, Palynology, Isotope analysis, Remanent magnetism, Geochronology, Stratigraphy, Correlation, Poland—Wola Grzymalina

51-3277

Patagonian origin of glacial dust deposits in East Antarctica (Vostok and Dome C) during glacial stages 2,4 and 6.

Basile, I., Grouset, F.E., Revel, M., Petit, J.R., Biscaye, P.E., Barkov, N.I., *Earth and planetary science letters,* Feb. 1997, 146(3-4), p.573-589, 51 refs.

Paleoclimatology, Atmospheric circulation, Dust, Sediment transport, Ice sheets, Ice composition, Ice cores, Isotope analysis, Origin, Antarctica—Vostok Station

The source area of continental dust deposited at both Vostok and Dome C sites (East Antarctica) during the glacial stages of the last two climatic cycles has remained constant. The isotopic composition of the ice-core dust has been compared with the isotopic composition of the potential source areas: Antarctica: New Zealand, Southern Africa, Australia and South America. This comparison reveals the southern South American provenance of the dust for all three glacial periods. The Patagonian loess and the marine shelf sediments from the Argentine continental shelf, which was variably emerged during glacial periods, display different isotopic compositions and that the composition of the Patagonian loess best matches the signature of the ice-core dust. The identification of the patagonian region as the source of the windblown dust deposited over East Antarctica during all the latest glacial periods permits a better understanding of paleo-atmospheric circulations of the last climatic cycles and a better constraint on the parameterization of dust sources for paleoatmospheric general circulation models. (Auth. mod.)

51-3278

Modern and last glacial maximum sea surface $\delta^{18}O$ derived from an Atmospheric General Circulation Model.

Juillet-Leclerc, A., Jouzel, J., Labeyrie, L., Joussaume, S., *Earth and planetary science letters,* Feb. 1997, 146(3-4), p.591-605, 31 refs.

Oceanography, Pleistocene, Ocean currents, Atmospheric circulation, Marine atmospheres, Surface waters, Surface temperature, Oxygen isotopes, Isotope analysis, Mathematical models, Air water interactions, Statistical analysis

51-3279

Sm-Nd signature of modern and late Quaternary sediments from the northwest North Atlantic: implications for deep current changes since the Last Glacial Maximum.

Innocent, C., Fagel, N., Stevenson, R.K., Hillaire-Marcel, C., *Earth and planetary science letters,* Feb. 1997, 146(3-4), p.607-625, 48 refs.

Pleistocene, Oceanography, Marine geology, Ocean currents, Sedimentation, Erosion, Quaternary deposits, Marine deposits, Isotope analysis, Drill core analysis, Statistical analysis, Atlantic Ocean

51-3280

Proceedings of the International Snow Science Workshop, Oct. 12-15, 1988, Whistler; A Merging of Theory and Practice.

International Snow Science Workshop, Whistler, BC, Canada, Oct. 12-15, 1988, Vancouver, BC, ISSW Committee, 1988, 303p., Refs. passim. For selected papers see 51-3281 through 51-3324.

Safety, Avalanches, Rescue operations, Avalanche triggering, Avalanche forecasting, Avalanche mechanics, Avalanche tracks

51-3281

Avalanche control ropeways: Coquihalla Highway avalanche safety program.

Stevens, J.R., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.11-15.

Safety, Avalanche triggering, Explosives, Cost analysis

51-3282

Recent improvements in CATEX (avalanche control ropeway) technology.

Borrel, G., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.16-22.

Safety, Avalanche triggering, Explosives

51-3283

Low cost explosive delivery systems for avalanche control.

Redden, L., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.28-33, 2 refs.

Safety, Avalanche triggering, Explosives, Cables (ropes), Cost analysis

51-3284

On the morphology and size of snow crystals.

Perla, R., Sommerfeld, R.A., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.34-36, 4 refs.

Snow crystals, Snow crystal structure, Microstructure

51-3285

On the effect of strong density layering on metamorphism of seasonal snowcover.

Adams, E.E., Brown, R.L., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.37-40, 2 refs.

Snow cover, Snow density, Metamorphism (snow), Vapor transfer

51-3286

Mobile gun positions.

Allen, B., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.41-46.

Avalanche triggering, Cost analysis

51-3287

Brief review of the Maseguchi avalanche in Japan in 1986.

Kobayashi, S., Izumi, K., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.57-62, 5 refs.

Avalanches, Avalanche mechanics, Snow cover, Japan

51-3288

Computer helped avalanche forecasting in France.

La Feuille, J., Brun, E., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.63-68.

Avalanche forecasting, Computer applications, Data processing, Snow depth, Models, Avalanche mechanics

51-3289

Steps toward computer-aided snow safety.

Schmidt, R.A., Hartman, H., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.69-72, 4 refs.

Avalanche forecasting, Computer applications, Data processing, Computer programs, Snowfall, Wind velocity, Snowdrifts

51-3290

Statistical analysis of snow stability, Alpine Meadows Ski Resort, California.

Swanson, K., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.73-82, 15 refs.

Avalanche forecasting, Statistical analysis, Mathematical models, Meteorological factors, Avalanche modeling

51-3291

Weather forecasts for avalanche prediction.

Ferguson, S.A., Moore, M.B., Marriott, R.T., Speers-Hayes, P., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.83-86, Extended abstract.

Avalanche forecasting, Weather forecasting, Meteorological factors

51-3292

North Cascade helicopter skiing risk.

Burr, E., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.87-90.

Avalanches, Avalanche protection, Environmental impact, United States—Washington—Mazama

51-3293

Three dimensional snow transport modeling over mountainous terrain.

Tesche, T.W., McNally, D.E., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.91-97, 11 refs.

Avalanche forecasting, Models, Snowfall, Snowstorms, Snow water equivalent

51-3294

Susan Jane avalanche path: a case study in ski area planning and avalanche path identification.

Marler, C., Fink, A., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.98-102, 1 ref.

Avalanche forecasting, Countermeasures

51-3295

In-situ tensile strength measurements of alpine snow.

Jamieson, J.B., Johnston, C.D., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.103-112, 10 refs.

Tensile properties, Snow strength, Snow mechanics, Microstructure, Snow density, Snow slides

51-3296

Field tests of avalanche beacons at 2275 Hz and 457 KHz.

Dozier, J., Faisant, R.D., Heywood, L., Reitman, G., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.113-118, 1 ref.

Radio beacons, Avalanches, Safety

51-3297

Enhancement of realism in avalanche rescue dog training exercises.

Maddox, J., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.119-124.

Rescue operations, Safety, Avalanches

51-3298

Rain on snow avalanche events; some observations.

Heywood, L., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.125-136, 4 refs.

Avalanche mechanics, Avalanche triggering, Rain, Avalanche forecasting, Slope orientation, Snow creep

51-3299

Evidence of liquid water flow through snow from thick-section photography.

McGurk, B.J., Kattelmann, R.C., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.137-139.

Avalanche mechanics, Water transport, Rain, Meltwater, Photographic equipment, Photographic techniques, United States—California—Sierra Nevada

51-3300

Mountain winds.

Emslie, J.H., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.142-145, 2 refs.

Wind factors, Wind velocity, Avalanche forecasting, Avalanche mechanics

51-3301

Standpipe precipitation gauge.

Campbell, E., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.146-147.

Precipitation gages, Plastics, Pumps, Cold weather performance, Cold weather operation

51-3302

Snowpack temperature sensor.

Campbell, E., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.148-149.

Sensors, Design, Temperature measurement, Thermistors, Cold weather performance, Cold weather operation, Snow temperature

51-3303

Royal Canadian Mounted Police Dog Service: avalanche search and rescue.

Barter, T., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.150-154.

Rescue operations, Safety, Avalanches

51-3304

BC Ministry of Transportation and Highways remote weather station system overview.

Bay, J., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.155-157.

Weather stations, Weather forecasting, Remote sensing, Computer applications, Computer programs

51-3305

Mount Bachelor's Pine Marten snowfence.

Jairell, R.L., Rodgers, T.C., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.158-161, 1 ref.

Snow fences, Design, Cost analysis, United States—Oregon—Bachelor, Mount

51-3306

CARDA and the avalanche rescue dog.

Schneider, W., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.162-165.

Rescue operations, Safety, Avalanches

51-3307

Remote on line snow cover profiling in avalanche release zones using microwave radar.

Gubler, H., Hiller, M., Weilenmann, P., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.166-174, 5 refs.

Remote sensing, Snow cover, Snow stratigraphy, Data processing, Radar, Avalanches, Snow electrical properties, Electromagnetic properties, Spectra

51-3308

Mobility of snow avalanches observed in Japan.

Izumi, K., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.175-178, 8 refs.

Avalanche forecasting, Avalanche tracks, Wet snow, Avalanche mechanics, Friction

51-3309

Behavior of a snow cover after crack formation on mountain slope.

Akitaya, E., Shimizu, H., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.179-186, 2 refs.

Snow cover, Cracks, Snow mechanics, Avalanche mechanics

51-3310

Look at a statewide public avalanche awareness program: ABC's week.

Atkins, D., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.187-192, 2 refs.

Safety, Avalanches

51-3311

Elastic energy in snow.

Fuller, R., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.193-202, 3 refs.

Snow elasticity, Avalanche mechanics, Avalanche modeling

51-3312

Snow dielectric devices and field applications.

Denoth, A., Wilhelmy, I., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.203-206, 4 refs.

Snow electrical properties, Dielectric properties, Sensors, Water content, Measuring instruments

51-3313

Effects of temperature on shear failure of alpine snow.

McClung, D.M., Anhorn, P.A., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.207-209, 3 refs.

Avalanche mechanics, Snow stratigraphy, Temperature effects, Snow strength, Snow deformation, Shear stress

51-3314

Observations relating to wet snow stability.

Conway, H., Breyfogle, S., Wilbour, C.R., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.211-222, 22 refs.

Wet snow, Snow cover stability, Avalanches, Snow stratigraphy, Snow cover structure, Snow electrical properties, Dielectric properties, Avalanche triggering, Avalanche formation, Snow crystals

51-3315

Ski friction and thermal response.

Warren, G.C., Colbeck, S.C., MP 4012, International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.223-225.

Skis, Friction, Heat flux, Meltwater

51-3316

Snow cover forecasting in ungaged areas.

Davis, R.E., Burak, S.A., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.226-228, 4 refs.

Snow water equivalent, Forecasting, Snow cover

51-3317

Development of the avalanche management program for the Coquihalla Highway.

Bennetto, J.D., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.229-231.

Avalanches, Countermeasures, Construction, Roads, Design

51-3318

Comparisons of Colorado, E. Sierra, coastal Alaska, and western Norway avalanche runout data.

Mears, A.I., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.232-238, 7 refs.

Avalanche tracks, Avalanche modeling, United States—Alaska, United States—Colorado, Norway, United States—Sierra Nevada

51-3319

Utah Avalanche Forecast Center user survey and formats for avalanche advisories.

Tremper, B., Ream, D., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.241-250, 4 refs.

Avalanche forecasting, Safety, Data processing, United States—Utah

51-3320

Avalanche forecasting and communication: experiences in avalanche hazard scales.

La Feuille, J., Pahaut, E., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.251-258, 4 refs.

Avalanche forecasting, Safety, Data processing, Classifications

51-3321

Monitoring basin-wide snowmelt with ablation stakes.

Kattelmann, R., Elder, K., Dozier, J., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.259-261, 4 refs.

Snowmelt, Ablation, Measuring instruments, Wet snow, Snow water equivalent, Snow density, Avalanche forecasting, Water balance, United States—California—Sierra Nevada

51-3322

Snowcover stability tests and the areal variability of snow strength.

Föhn, P.M.B., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.262-273, 15 refs.

Snow cover stability, Snow strength, Tests, Shear strength, Slope stability, Avalanche forecasting

51-3323
Evaluation of the shovel shear test.
Schaerer, P., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.274-276, Extended abstract.
Snow cover stability, Snow strength, Tests, Shear strength

51-3324
Hydrological importance of avalanche snow, Kaghan Valley, Himalaya Mountains, Pakistan.
De Scally, F., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.277-283, 5 refs.
Avalanche deposits, Avalanche tracks, Snowmelt, Snow hydrology, Meltwater, Ablation, Avalanche forecasting, Pakistan—Kaghan Valley, Himalaya Mountains

51-3325
Topographic and altitudinal patterns in plant communities on European arctic islands.
Virtanen, R.J., Lundberg, P.A., Moen, J., Oksanen, L., *Polar biology,* Feb. 1997, 17(2), p.95-113, Refs. p.111-113.
Plant ecology, Arctic landscapes, Ecosystems, Classifications, Vegetation patterns, Mosses, Biomass, Distribution, Altitude, Topographic features, Sampling, Statistical analysis, Norway—Jan Mayen, Norway—Bear Island, Norway—Spitsbergen

51-3326
Abundance, diversity and community patterns of epibenthic- and benthic-boundary layer peracarid crustaceans at 75°N off East Greenland.
Brandt, A., *Polar biology,* Feb. 1997, 17(2), p.159-174, Refs. p.172-174.
Oceanographic surveys, Marine biology, Biomass, Ocean bottom, Ecosystems, Sampling, Classifications, Ice edge, Nutrient cycle, Ice cover effect, Statistical analysis, Greenland Sea

51-3327
Predicting methane emission from bryophyte distribution in northern Canadian peatlands.
Bubier, J.L., Moore, T.R., Juggins, S., *Ecology,* Apr. 1995, 76(3), p.677-693, 63 refs.
Wetlands, Subarctic landscapes, Ecosystems, Peat, Mosses, Classifications, Natural gas, Soil air interface, Vapor transfer, Water table, Soil tests, Statistical analysis, Greenhouse effect, Forecasting, Canada

51-3328
Responses of arctic tundra to experimental and observed changes in climate.
Chapin, F.S., III, Shaver, G.R., Giblin, A.E., Nadelhoffer, K.J., Laundre, J.A., *Ecology,* Apr. 1995, 76(3), p.694-711, Refs. p.709-711.
Tundra climate, Tundra vegetation, Vegetation patterns, Tundra soils, Thaw depth, Global warming, Climatic changes, Photosynthesis, Nutrient cycle, Biomass, Simulation, Light effects, Environmental impact

51-3329
Distribution of planktic foraminifera at the ice margin in the Arctic (Fram Strait).
Carstens, J., Hebbeln, D., Wefer, G., *Marine micropaleontology,* Feb. 1997, 29(3-4), p.257-269, Refs. p.267-269.
Oceanography, Marine biology, Biomass, Plankton, Sampling, Paleoecology, Biomass, Distribution, Classifications, Ecosystems, Ice edge, Ice cover effect, Arctic Ocean

51-3330
Morphometric variation of *Actinomma boreale* (Radiolaria) in Atlantic boreal waters.
Cortese, G., Bjørklund, K.R., *Marine micropaleontology,* Feb. 1997, 29(3-4), p.271-282, 34 refs.
Marine biology, Biomass, Paleoecology, Bottom sediment, Plankton, Microstructure, Growth, Structural analysis, Microscope slides, Classifications, Radioactive age determination, Surface temperature, Atlantic Ocean

51-3331
Pedosedimentary development and palaeoenvironmental significance of the S1 palaeosol on the northeastern margin of the Qinghai-Xizang (Tibetan) Plateau.
Kemp, R.A., Derbyshire, E., Chen, F.H., Ma, H.Z., *Journal of Quaternary science,* Mar.-Apr. 1996, 11(2), p.95-106, 32 refs.
Paleoclimatology, Climatic changes, Quaternary deposits, Loess, Eolian soils, Stratigraphy, Sediment transport, Sedimentation, Soil formation, Remanent magnetism, Thin sections, Microstructure, Geochronology, Correlation, China—Tibet

51-3332
Mass spectrometric dating of flowstones from Stump Cross Caverns and Lancaster Hole, Yorkshire; palaeoclimate implications.
Baker, A., Smart, P.L., Edwards, R.L., *Journal of Quaternary science,* Mar.-Apr. 1996, 11(2), p.107-114, 27 refs.
Caves, Paleoclimatology, Flooding, Rock properties, Quaternary deposits, Sedimentation, Geochronology, Radioactive age determination, Isotope analysis, Hydrogeochemistry, Correlation, United Kingdom—Yorkshire

51-3333
Comparison of Quaternary interglacial periods in the Iceland Sea.
Eide, L.K., Beyer, I.K., Jansen, E., *Journal of Quaternary science,* Mar.-Apr. 1996, 11(2), p.115-124, 36 refs.
Oceanographic surveys, Quaternary deposits, Marine deposits, Ocean currents, Paleoclimatology, Paleoecology, Plankton, Biomass, Ice age theory, Glacier oscillation, Drill core analysis, Oxygen isotopes, Isotope analysis, Correlation, Iceland Sea

51-3334
Vegetation and climate of northwest Iberia over the last 14,000 yr.
Allen, J.R.M., Huntley, B., Watts, W.A., *Journal of Quaternary science,* Mar.-Apr. 1996, 11(2), p.125-147, 50 refs.
Paleoclimatology, Climatic changes, Lacustrine deposits, Lithology, Stratigraphy, Paleobotany, Vegetation patterns, Palynology, Geochronology, Correlation, Radioactive age determination, Spain—Laguna de la Roya

51-3335
Proglacial glaciotectonic deformation associated with glaciolacustrine sedimentation, Lake Pukaki, New Zealand.
Hart, J.K., *Journal of Quaternary science,* Mar.-Apr. 1996, 11(2), p.149-160, 25 refs.
Quaternary deposits, Glacial geology, Lacustrine deposits, Sedimentation, Moraines, Lithology, Tectonics, Deformation, Ice push, Ice solid interface, Subglacial drainage, New Zealand—Pukaki, Lake

51-3336
Three-dimensional reconstruction of carbon accumulation and CH_4 emission during nine millennia in a raised mire.
Korhola, A., Alm, J., Tolonen, K., Turunen, J., Jungner, H., *Journal of Quaternary science,* Mar.-Apr. 1996, 11(2), p.161-165, 27 refs.
Wetlands, Peat, Sampling, Quaternary deposits, Natural gas, Vapor diffusion, Soil air interface, Geochemical cycles, Landscape development, Models, Radioactive age determination

51-3337
Seismo- and neotectonics in Finnmark, Kola Peninsula and the southern Barents Sea. Part 1: geological and neotectonic framework.
Roberts, D., Olesen, O., Karpuz, M.R., *Tectonophysics,* Feb. 28, 1997, 270(1-2), p.1-13, 44 refs.
Marine geology, Earth crust, Tectonics, Geologic structures, Geological surveys, LANDSAT, Drill core analysis, Classifications, Profiles, Russia—Kola Peninsula, Barents Sea

51-3338
Seismo- and neotectonics in Finnmark, Kola and the southern Barents Sea. Part 2: Seismological analysis and seismotectonics.
Bungum, H., Lindholm, C., *Tectonophysics,* Feb. 28, 1997, 270(1-2), p.15-28, 36 refs.
Marine geology, Earth crust, Tectonics, Seismology, Seismic velocity, Earthquakes, Stress concentration, Isostasy, Detection, Periodic variations, Barents Sea, Russia—Kola Peninsula, Finland

51-3339
Brittle failure of columnar freshwater ice under off-axis compression loading.
Picu, R.C., Bergström, J.S., Gupta, V., *Scripta materialia,* Dec. 6, 1996, 36(1), p.63-67, 8 refs.
Ice physics, River ice, Mechanical tests, Cracking (fracturing), Bearing strength, Brittleness, Ice solid interface, Loading, Shear stress, Stress concentration, Orientation, Impact tests, Ice elasticity

51-3340
Effects of roadside disturbance on substrate and vegetation properties in arctic tundra.
Auerbach, N.A., Walker, M.D., Ealker, D.A., *Ecological applications,* Feb. 1997, 7(1), p.218-235, Refs. p.233-235.
Arctic landscapes, Tundra vegetation, Tundra soils, Ecosystems, Biomass, Vegetation patterns, Active layer, Permafrost transformation, Roadbeds, Substrates, Damage, Construction, Dust, Environmental impact, United States—Alaska

51-3341
Comments on "Stability of the viscous-plastic sea ice rheology".
Dukowicz, J.K., Gray, J.M.N.T., Killworth, P.D., *Journal of physical oceanography,* Mar. 1997, 27(3), p.480-483, Includes reply. 8 refs. For pertinent paper see 49-5252.
Sea ice, Ice cover strength, Rheology, Ice mechanics, Ice water interface, Strains, Viscosity, Ice plasticity, Plastic flow, Stability, Analysis (mathematics)

51-3342
Tundra plant uptake of amino acid and NH_4^+ nitrogen in situ: plants compete well for amino acid N^1.
Schimel, J.P., Chapin, F.S., III, *Ecology,* Oct. 1996, 77(7), p.2142-2147, 18 refs.
Plant physiology, Plant ecology, Subarctic landscapes, Tundra vegetation, Tundra soils, Soil tests, Nutrient cycle, Organic soils, Coring, Soil microbiology, Geochemical cycles

51-3343
Vertical seismic profile results from the Kola Superdeep Borehole, Russia.
Carr, B.J, et al, *Tectonophysics,* Oct. 30, 1996, 264(1-4), International Symposium on Seismic Reflection Probing of the Continents and Their Margins, 6th, Budapest, Hungary, Sep. 12-17, 1994. Selected papers, p.295-307, 35 refs.
Geological surveys, Subpolar regions, Tectonics, Seismic reflection, Seismic velocity, Profiles, Boreholes, Interfaces, Shear properties, Wave propagation, Russia—Kola Peninsula

51-3344
Potentiality of the ground-penetrating radar for the analysis of the stratigraphy and sedimentology of Mars.
Ori, G.G., Ogliani, F., *Planetary and space science,* Nov. 1996, 44(11), p.1303-1315, 20 refs.
Mars (planet), Remote sensing, Geophysical surveys, Regolith, Stratigraphy, Radar echoes, Subsurface investigations, Subsurface structures, Profiles, Permafrost structure, Ice vapor interface, Porosity

51-3345
Channels and valleys on Mars: cold climate features formed as a result of a thickening cryosphere.
Carr, M.H., *Planetary and space science,* Nov. 1996, 44(11), p.1411-1423, 52 refs.
Mars (planet), Geocryology, Regolith, Ground ice, Climatic changes, Subsurface drainage, Hydrologic cycle, Geomorphology, Subpermafrost ground water

51-3346
Abiotic and biotic forcing on vertical particle flux in the southern ocean.
Bathmann, U.V., SCOPE 57. Particle flux in the ocean, edited by V. Ittekkot, P. Schäfer, S. Honjo and P.J. Depetris, Chichester, England, John Wiley & Sons, 1996, p.243-250, Refs. p.248-250.
DLC GC117.C37P37 1996
Marine biology, Ecosystems, Plankton, Sea ice, Ice cover effect, Algae, Antarctica—Weddell Sea
The objective of this paper is to show the importance of physical, chemical and biological constraints for structuring the pelagic ecosystems and determining the eventual fate of the organic matter and the role of zooplankton thereby. Data collected by the author on pelagic system structure, on mechanisms and fluxes within the pelagic realm are reviewed for various scenarios, from different sites in the Weddell Sea, in the course of a year. It starts with the description of copepod biology in winter along a transect across the ice covered Weddell Sea and continues by presenting three scenarios for pelagic system structure during austral spring and summer (Nov. to Jan.). An autumn situation completes the course through the annual succession within pelagic antarctic ecosystems of the Weddell Sea.

51-3347
Baby, its cold inside. *Science,* Apr. 25, 1997, 276(5312), p.537, 539.
Laboratories, Environment simulation, Snow physics, Hydrology, Cold chambers, Japan

51-3348
Antarctic tectonics: constraints from an ERS-1 satellite marine gravity field.
McAdoo, D., Laxon, S., *Science,* Apr. 25, 1997, 276(5312), p.556-560, 39 refs.
Tectonics, Gravity, Sea ice, Gravimetric prospecting, Antarctica—Ross Sea, Antarctica—Weddell Sea
A high-resolution gravity field of poorly charted and ice-covered ocean near West Antarctica, from the Ross Sea east to the Weddell Sea, has been derived with the use of satellite altimetry, including ERS-1 geodetic phase, wave-form data. This gravity field reveals regional tectonic fabric, such as gravity lineations, which are the expression of fracture zones left by early (65 to 83 mya) Pacific-Antarctic sea-floor spreading that separated the Campbell Plateau and New Zealand continent from West Antarctica. These lineations constrain plate motion history and confirm the hypothesis that Antarctica behaved as two distinct plates, separated from each other by an extensional Bellingshausen plate boundary active in the Amundsen Sea before about 61 mya. (Auth.)

51-3349
Climatic limits on landscape development in the northwestern Himalaya.
Brozović, N., Burbank, D.W., Meigs, A.J., *Science,* Apr. 25, 1997, 276(5312), p.571-574, 39 refs.
Geologic structures, Landscape development, Periglacial processes, Pakistan, Himalaya Mountains

51-3350
Radiation and eddy flux experiment 1995 *(Reflex III).*
Hartmann, J., Bochert, A., Freese, D., Kottmeier, C., Nagel, D., Reuter, A., *Berichte zur Polarforschung,* 1997, No.218, 72p., p.73 and 74 missing.
Aerial surveys, Sea ice, Measuring instruments, Cloud physics, Solar radiation, Arctic Ocean, Norway—Svalbard

51-3351
New station recommended for the South Pole.
Monastersky, R., *Science news,* Mar. 22, 1997, 151(12), p.175, See A-57096 or 51-3352, for a parallel report in Science, 175(5307):1732, Mar. 21, 1997.
Construction, Stations, Research projects, Antarctica—Amundsen-Scott Station
The report tells of a strong endorsement by an independent review board, chaired by Norman Augustine, CEO of Lockheed Martin, of plans to rebuild the facility at Amundsen-Scott Station. The endorsement includes a $20 million cut in funds over five years in science projects to help pay for the station refit.

51-3352
U.S. antarctic panel makes case for replacement station.
Mervis, J., *Science,* Mar. 21, 1997, 275(5307), p.1732, See A-57095 or 51-3351 for a parallel report in Science News, 151(12):175, Mar. 21, 1997.
Construction, Stations, Research projects, Antarctica—Amundsen-Scott Station
The report tells of a strong endorsement by a blue ribbon panel, chaired by Norman Augustine, CEO of Lockheed Martin, of plans to rebuild the facility at Amundsen-Scott Station. The endorsement includes a $20 million cut in funds over five years in science projects to help pay for the station refit.

51-3353
Accurate parameterization of the solar radiative properties of cirrus clouds for climate models.
Fu, Q., *Journal of climate,* Sep. 1996, 9(9), p.2058-2082, 44 refs.
Clouds (meteorology), Climatology, Cloud physics, Optical properties, Radiation absorption, Light scattering, Ice crystal optics, Ice crystal size, Spectra, Particle size distribution, Attenuation, Albedo, Statistical analysis

51-3354
Impact of clouds on surface radiative fluxes and snowmelt in the Arctic and subarctic.
Zhang, T., Stamnes, K., Bowling, S.A., *Journal of climate,* Sep. 1996, 9(9), p.2110-2123, 28 refs.
Climatology, Cloud cover, Optical properties, Radiation absorption, Radiation balance, Snow hydrology, Snowmelt, Seasonal variations, Cloud physics, Cloud droplets, Water content, Surface temperature, Mathematical models

51-3355
Possible change in mass balance of Greenland and antarctic ice sheets in the coming century.
Ohmura, A., Wild, M., Bengtsson, L., *Journal of climate,* Sep. 1996, 9(9), p.2124-2135, 24 refs.
Climatology, Polar atmospheres, Precipitation (meteorology), Global warming, Sea level, Ice sheets, Glacier mass balance, Glacier oscillation, Simulation, Air temperature, Temperature effects, Long range forecasting, Greenland, Antarctica
A high-resolution General Circulation Model (GCM) is found to simulate precipitation and surface energy balance of high latitudes with high accuracy. This opens new possibilities to investigate the future mass balance of polar glaciers and its effect on sea level. The surface mass balance of the Greenland and the antarctic ice sheets is simulated using the ECHAM3 GCM. With this model, two 5-year integrations for the present and doubled carbon dioxide conditions based on the boundary conditions provided by the ECHAM1/T21 transient experiment have been conducted. A comparison of the two experiments over Greenland and Antarctica shows to what extent the effect of climate change on the mass balance on the two largest glaciers of the world can differ. On Antarctica a large increase in accumulation without melt is projected. Translating the mass balances into terms of sea-level equivalent, the mass balance accumulation on Antarctica tends to lower it by 0.9 mm/yr. The change in the combined mass balance of the two continents is almost zero. (Auth. mod.)

51-3356
Low-diversity antarctic soil nematode communities: distribution and response to disturbance.
Freckman, D.W., Virginia, R.A., *Ecology,* Mar. 1997, 78(2), p.363-369, 44 refs.
Soil microbiology, Biomass, Ecosystems, Soil composition, Nutrient cycle, Simulation, Climatic changes, Sensors, Environmental tests
This paper examines the distribution, biodiversity, and abundance of nematodes in the most extreme terrestrial environment on earth, the Dry Valley region of Antarctica. The nematode community structure of 1-3 species in two functional groups may be the simplest soil food web of any terrestrial ecosystem. In a field experiment, treatments increasing soil water, carbon, and temperature, alone or in combination, generally decreased the abundance of the single omnivore-predator species and increased the abundance of its microbivorous prey species. These low-diversity nematode communities, limited to ≤3 species, apparently lack species redundancy and appear sensitive to environmental change. These findings suggest that antarctic soil ecosystems are sensitive to anthropogenic disturbance. (Auth. mod.)

51-3357
Effects of mobile tree islands on soil carbon storage in tundra ecosystems.
Pauker, S.J., Seastedt, T.R., *Ecology,* Dec. 1996, 77(8), p.2563-2567, 20 refs.
Alpine tundra, Tundra soils, Forest lines, Tundra vegetation, Podsol, Soil formation, Ecosystems, Organic soils, Soil chemistry, Sampling, Vegetation factors, Vegetation patterns

51-3358
Role of an internal heat source for the eruptive plumes on Triton.
Duxbury, N.S., Brown, R.H., *Icarus,* Jan. 1997, 125(1), p.83-93, 43 refs.
Extraterrestrial ice, Satellites (natural), Regolith, Volcanoes, Upwelling, Vapor pressure, Phase transformations, Hydrodynamics, Heat sources, Heat flux, Convection, Ice composition, Cryogenics, Analysis (mathematics)

51-3359
Carbonic acid by ion implantation in water/carbon dioxide ice mixtures.
Brucato, J.R., Palumbo, M.E., Strazzulla, G., *Icarus,* Jan. 1997, 125(1), p.135-144, 34 refs.
Extraterrestrial ice, Cosmic dust, Ice physics, Geochemistry, Ionization, Carbon dioxide, Ice sublimation, Simulation, Radiation absorption, Spectra, Ice spectroscopy, Infrared spectroscopy, Ion diffusion

51-3360
Mercury's polar caps and the generation of an OH exosphere.
Killen, R.M., Benkhoff, J., Morgan, T.H., *Icarus,* Jan. 1997, 125(1), p.195-211, 63 refs.
Extraterrestrial ice, Polar regions, Ice sheets, Regolith, Water transport, Ground ice, Vapor transfer, Ice sublimation, Atmospheric composition, Mass transfer

51-3361
Vertical distribution of water in the near-equatorial troposphere of Mars: water vapor and clouds.
Rodin, A.V., Korablev, O.I., Moroz, V.I., *Icarus,* Jan. 1997, 125(1), p.212-229, 27 refs.
Mars (planet), Extraterrestrial ice, Atmospheric composition, Cloud cover, Optical properties, Cloud physics, Water vapor, Vapor diffusion, Spectroscopy, Profiles, Ice crystal size, Ice detection

51-3362
Model studies of chlorine deactivation and formation of $ClONO_2$ collar in the arctic polar vortex.
Chipperfield, M.P., Lutman, E.R., Kettleborough, J.A., Pyle, J.A., Roche, A.E., *Journal of geophysical research,* Jan. 20, 1997, 102(D2), p.1467-1478, 26 refs.
Polar atmospheres, Atmospheric composition, Stratosphere, Cloud physics, Atmospheric circulation, Degradation, Aerosols, Turbulent diffusion, Spectroscopy, Remote sensing, Models, Heterogeneous nucleation

51-3363
Three-dimensional studies of the 1991-1992 northern hemisphere winter using domain-filling trajectories.
Lutman, E.R., et al, *Journal of geophysical research,* Jan. 20, 1997, 102(D2), p.1479-1488, 37 refs.
Polar atmospheres, Atmospheric composition, Polar stratospheric clouds, Cloud physics, Degradation, Heterogeneous nucleation, Photochemical reactions, Aerosols, Turbulent diffusion, Atmospheric circulation, Air flow, Seasonal variations, Models, Simulation

51-3364
Second European Stratospheric Arctic and Mid-latitude Experiment campaign: correlative measurements of aerosol in the northern polar atmosphere.
Brogniez, C., et al, *Journal of geophysical research,* Jan. 20, 1997, 102(D2), p.1489-1494, 23 refs.
Polar atmospheres, Stratosphere, Cloud physics, Aerosols, Atmospheric composition, Radiometry, Lidar, Photometry, Backscattering, Radiance, Refractivity, Volcanic ash, Correlation

51-3365
Finite element analysis of ground freezing for tunnel construction.
van Jaarsveld, E., European Young Geotechnical Engineers' Conference, 10th, Izmir, Turkey, Oct. 21-24, 1996. Proceedings, Izmir, Turkish National Committee for Soil Mechanics and Foundation Engineering, 1996, p.173-178.
Tunneling (excavation), Railroad tunnels, Subgrades, Soil freezing, Artificial freezing, Soil temperature, Temperature gradients, Frozen ground thermodynamics, Soil stabilization, Models

51-3366

Numerical modelling and simulation of snow drift—application to snow engineering.

Sundsbø, P.A., Narvik, Norwegian University of Science and Technology, 1997, 46p. + appends., Ph.D thesis. 36 refs.

Snow mechanics, Blowing snow, Snowdrifts, Snow air interface, Fluid dynamics, Turbulent diffusion, Sediment transport, Topographic effects, Simulation, Mathematical models, Snow fences, Wind factors

51-3367

Novel definition of a molecule in a crystal.

Spackman, M.A., Byrom, P.G., *Chemical physics letters*, Mar. 21, 1997, 267(3-4), p.215-220, 32 refs.

Ice physics, Ice crystal structure, Molecular structure, Classifications, Structural analysis, Dielectric properties, Ice dielectrics, Molecular energy levels, X ray diffraction, Statistical analysis

51-3368

Theoretical and experimental studies of laminar mixed convection in water pipe flow with density inversion effect.

Hwang, G.J., Tsai, C.W., *International journal of heat and mass transfer*, June 1997, 40(9), p.2019-2033, 29 refs.

Water pipes, Pipe flow, Water flow, Laminar flow, Convection, Heat transfer, Density (mass/volume), Water temperature, Isotherms, Temperature effects, Mathematical models

51-3369

Should the Coast Guard stay in the icebreaking business?

Venzke, N.C., *U.S. Naval Institute. Proceedings*, Dec. 1992, 118(12), p.97-98.

Icebreakers, Construction, Logistics, Cost analysis, Legislation

51-3370

Photoinhibition of photosystem II in subchloroplast preparations after exposure to freezing temperature.

Khorobrykh, A.A., Zastrizhnaia, O.M., Klimov, V.V., *Russian journal of plant physiology*, Mar.-Apr. 1997, 44(2), p.171-176, Translated from Fiziologiia rastenii. 33 refs.

Plant physiology, Plant tissues, Particles, Low temperature tests, Cold stress, Photochemical reactions, Light effects, Freeze thaw tests, Damage

51-3371

Molybdenum-induced increase in frost tolerance of winter wheat grown on acidic soil.

Vankova-Radeva, R.V., Ianeva, I.A., Baidanova, V.D., L'vov, N.P., Karasev, G.S., Trunova, T.I., *Russian journal of plant physiology*, Mar.-Apr. 1997, 44(2), p.204-209, Translated from Fiziologiia rastenii. 22 refs.

Plant physiology, Agriculture, Grasses, Plant tissues, Frost resistance, Cold tolerance, Nutrient cycle, Metals, Chemical properties, Soil chemistry, Cold weather tests, Temperature effects

51-3372

Analysis of merged SMMR-SSMI time series of arctic and antarctic sea ice parameters 1978-1995.

Bjørgo, E., Johannessen, O.M., Miles, M.W., *Geophysical research letters*, Feb. 15, 1997, 24(4), p.413-416, 17 refs.

Oceanography, Sea ice distribution, Ice surveys, Spacecraft, Radiometry, Sensors, Brightness, Seasonal variations, Ablation, Correlation, Statistical analysis

Satellite passive microwave sensors, the Nimbus 7 Scanning Multichannel Microwave Radiometer and the Defense Meteorological Satellite Program Special Sensor Microwave Imager flew simultaneously during a 6-week overlap period in July and Aug. 1987, thus enabling intercomparison of the two sensors. Brightness temperatures are corrected for instrument drift and calibration differences in order to produce continuous time series of monthly averaged arctic and antarctic sea ice extent and sea ice area through the use of the NOrwegian Remote Sensing EXperiment algorithm, which relates brightness temperatures to ice concentration. The results are consistent with simulations that suggest retreat of the sea ice cover under global warming scenarios. (Auth. mod.)

51-3373

Physically based inversion of surface snow concentrations of H_2O_2 to atmospheric concentrations at South Pole.

McConnell, J.R., Winterle, J.R., Bales, R.C., Thompson, A.M., Stewart, R.W., *Geophysical research letters*, Feb. 15,1997, 24(4), p.441-444, 10 refs.

Polar atmospheres, Climatology, Snow air interface, Snow temperature, Mass transfer, Aerosols, Sampling, Seasonal variations, Models, Photochemical reactions, Antarctica—Amundsen-Scott Station

A unique series of surface snow samples, collected from Nov., 1994 through Jan., 1996 at South Pole and analyzed for H_2O_2, were used to test a physically based model for the atmosphere-to-snow component of the overall transfer function. A comparison of photochemical model estimates of atmospheric H_2O_2, (1) demonstrates that the surface snow acts as an excellent archive of atmospheric H_2O_2 and (2) suggests that snow temperature is the dominant factor determining atmosphere-to-surface snow transfer at South Pole. The estimated annual cycle in atmospheric H_2O_2 concentration is approximately symmetric about the summer solstice, with a peak value of ca. 280 pptv and a minimum around the winter solstice of ca. 1 pptv, although some asymmetry results from the springtime stratospheric ozone hole over Antarctica. (Auth. mod.)

51-3374

Using GIS for glacier volume calculations and topographic influence of the radiation balance. An example from Disko, West Greenland.

Bøcker, C.A., *Geografisk tidsskrift*, 1996, Vol.96, p.11-20, 20 refs.

Glacier surveys, Geomorphology, Geophysical surveys, Photogrammetry, Ice volume, Glacier thickness, Topographic effects, Topographic maps, Radiation balance, Data processing, Statistical analysis, Greenland—Disko

51-3375

Moraine systems in the Faroe Islands: glaciological and climatological implications.

Humlum, O., Christiansen, H.H., Svensson, H., Mortensen, L.E., *Geografisk tidsskrift*, 1996, Vol.96, p.21-31, 41 refs.

Geomorphology, Geophysical surveys, Glaciation, Moraines, Quaternary deposits, Cirques, Paleoclimatology, Climatic changes, Snow line, Radioactive age determination, Terrain identification, Topographic surveys, Denmark—Faroe Islands

51-3376

Effect of permafrost and palaeo-environmental history on soil formation in the lower Kolyma Lowland, Siberia.

Jakobsen, B.H., Siegert, C., Ostroumov, V., *Geografisk tidsskrift*, 1996, Vol.96, p.40-50, 33 refs.

Arctic landscapes, Soil formation, Soil profiles, Active layer, Tundra soils, Chemical properties, Cryoturbation, Paleoclimatology, Climatic changes, Podsol, Permafrost bases, Russia—Siberia

51-3377

Meteorological observations in 1995 at the arctic station, Qeqertarsuag (Godhavn), central West Greenland.

Humlum, O., Nielsen, N., Rasch, M., Hansen, B.U., *Geografisk tidsskrift*, 1996, Vol.96, p.119-122, 1 ref.

Climatology, Meteorological data, Ice sheets, Weather observations, Wind velocity, Snow depth, Soil temperature, Snow cover effect, Seasonal variations, Statistical analysis, Greenland

51-3378

Dynamical modelling of wintertime lidar observations in the Arctic: ozone laminae and ozone depletion.

Orsolini, Y.J., Hansen, G., Hoppe, U.P., Manney, G.L., Fricke, K.H., *Royal Meteorological Society. Quarterly journal A*, Apr. 1997, 123(539), p.785-800, 28 refs.

Climatology, Polar atmospheres, Atmospheric composition, Lidar, Ozone, Sounding, Stratification, Turbulent diffusion, Seasonal variations, Profiles, Advection, Models, Statistical analysis

51-3379

Recent geomorphologic evolution of a glaciovolcanic active stratovolcano, Popocatepetl (Mexico).

Palacios, D., *Geomorphology*, Aug. 1996, 16(4), p.319-335, 43 refs.

Geomorphology, Volcanoes, Volcanic ash, Mountain glaciers, Glacial hydrology, Ice push, Meltwater, Water erosion, Mass flow, Landforms, Landscape development, Geochronology, Mexico—Popocatepetl

51-3380

Petrology and geochemistry of the Kruuse Fjord Gabbro Complex, East Greenland.

Arnason, J.G., Bird, D.K., Bernstein, S., Rose, N.M., Manning, C.E., *Geological magazine*, Jan. 1997, 134(1), p.67-89, Refs. p.87-89.

Marine geology, Geological surveys, Tectonics, Earth crust, Magma, Geologic structures, Geochemistry, Rock properties, Stratification, Sampling, Pleistocene, Greenland

51-3381

High-frequency dielectric spectroscopy on glycerol.

Lunkenheimer, P., Pimenov, A., Schiener, B., Böhmer, R., Loidl, A., *Europhysics letters*, Mar. 10, 1996, 33(8), p.611-616, 16 refs.

Polymers, Supercooling, Liquid cooling, Dielectric properties, Low temperature research, Spectroscopy, Temperature effects, Density (mass/volume), Statistical analysis

51-3382

State of stress and tectonic evolution of the West Spitsbergen Fold Belt.

Manby, G.M., Lyberis, N., *Tectonophysics*, Dec. 30, 1996, 267(1-4), p.1-29, Refs. p.27-29.

Subpolar regions, Tectonics, Pleistocene, Geologic structures, Marine geology, Stress concentration, Geological maps, Norway—Spitsbergen

51-3383

Spatial length scale analysis of data from observations and a model of the Iceland-Faeroes front.

Aranuvachapun, S., Maskell, S.J., Griffiths, C., *Ocean engineering*, June 1997, 24(6), p.513-530, 19 refs.

Oceanographic surveys, Subpolar regions, Hydrography, Ocean currents, Boundary layer, Statistical analysis, Spectra, Salinity, Water temperature, Forecasting, Norwegian Sea

51-3384

Analysis of mass transfer in arctic plumes (implications for global climate).

Oertling, A.B., Schwarz, S.G., John, V.T., *Journal of fluids engineering*, Dec. 1996, 118(4), p.870-872, 22 refs.

Oceanography, Climatology, Atmospheric composition, Spaceborne photography, Buoyancy, Ocean currents, Mass transfer, Hydrates, Natural gas, Stability, Greenhouse effect, Air water interactions, Models, Environmental impact

51-3385

City of Calgary solves grade crossing problems.

Public works, May 1997, 128(6), p.44-45.

Municipal engineering, Winter maintenance, Railroad tracks, Roadbeds, Construction materials, Winter maintenance, Freeze thaw cycles, Damage, Frost heave, Modification, Modular construction, Rubber, Frost resistance, Canada—Alberta—Calgary

51-3386

Anti-icing—part two. Hitting the high points.

Barger, S., *Public works*, Feb. 1997, 128(2), p.36,64.

Road icing, Winter maintenance, Ice prevention, Antifreezes, Solutions, Freezing points, Chemical properties, Cold weather performance, Education

51-3387

^{14}C dating and soil organic matter dynamics in arctic and subarctic ecosystems.

Cherkinskii, A.E., *Radiocarbon*, 1996, 38(2), p.241-245, 3 refs.

Ecosystems, Soil dating, Organic soils, Tundra soils, Taiga, Soil formation, Soil profiles, Carbon isotopes, Isotope analysis, Radioactive age determination, Decomposition

51-3388

Thermal storage system achieves operating and first-cost savings.

O'Neal, E.J., *ASHRAE journal*, Apr. 1996, 38(4), p.59-60,63-64.

Air conditioning, Cooling systems, Design, Water temperature, Ice makers, Ice (water storage), Electric power, Cost analysis

51-3389

Paludification in the Tsentral'no-Sibirskiĭ Biosphere Reserve (the Enisei Region of Siberia).

Gorozhankina, S.M., *Russian journal of ecology*, Mar.-Apr. 1997, 28(2), p.67-72, Translated from Ekologiia. 15 refs.

Subarctic landscapes, Geomorphology, Ecosystems, Landscape development, Wetlands, Taiga, Paludification, Peat, Classifications, Vegetation patterns, Soil analysis, Stratigraphy, Russia—Siberia

51-3390

Effect of technogenic disturbances on the seasonal dynamics of phytocenoses in the cryolitic zone of western Siberia.

Moskalenko, N.G., *Russian journal of ecology*, Mar.-Apr. 1997, 28(2), p.84-88, Translated from Ekologiia. 6 refs.

Subarctic landscapes, Plant ecology, Taiga, Forest tundra, Tundra soils, Geocryology, Vegetation patterns, Growth, Phenology, Tracked vehicles, Damage, Soil temperature, Environmental impact, Russia—Siberia

51-3391

Impact of heavy caterpillar vehicles on vegetational cover in the subzone of typical tundra.

Andreĭshkina, N.I., *Russian journal of ecology*, Mar.-Apr. 1997, 28(2), p.123-125, Translated from Ekologiia.

Plant ecology, Ecosystems, Tundra vegetation, Tundra soils, Vegetation patterns, Soil microbiology, Biomass, Tracked vehicles, Damage, Environmental impact, Revegetation

51-3392

Observation of an emulsion microstructure with cryo-FESEM.

Yamashita, M., Kameyama, K., Kobayashi, R., Asahina, A., Aita, S., Ogura, K., *Journal of electron microscopy*, Oct. 1996, 45(5), p.461-462, 7 refs.

Scanning electron microscopy, Frozen liquids, Colloids, Cryogenic structures, Microstructure, Thin sections, Imaging, Structural analysis

51-3393

Detachment folds with fixed hinges and variable detachment depth, northeastern Brooks Range, Alaska.

Homza, T.X., Wallace, W.K., *Journal of structural geology*, Mar.-Apr. 1997, 19(3-4), p.337-354, 34 refs.

Geological surveys, Tectonics, Geologic structures, Subsurface structures, Layers, Earth crust, Rock mechanics, Stratigraphy, Strains, Migration, United States—Alaska—Brooks Range

51-3394

Comment on "Microphysical growth state of ice particles and large-scale electrical structure of clouds" by Earle Williams, Renyi Zhang, and Dennis Boccippio.

Saunders, C.P.R., Williams, E.R., Zhang, R., *Journal of geophysical research*, Dec. 27, 1996, 101(D23), p.29,599-29,601, Includes reply. 24 refs. For pertinent paper see 48-4855.

Cloud physics, Ice physics, Convection, Ice sublimation, Ice water interface, Ice crystal growth, Charge transfer, Cloud electrification, Hoarfrost, Heat balance, Water content, Accuracy

51-3395

Density of rime in laboratory simulations of thunderstorm microphysics and electrification.

Williams, E.R., Zhang, R.Y., *Journal of geophysical research*, Dec. 27, 1996, 101(D23), p.29,715-29,719, 37 refs.

Precipitation (meteorology), Thunderstorms, Cloud physics, Cloud electrification, Ice formation, Hoarfrost, Ice density, Ice structure, Classifications, Charge transfer, Polarization (charge separation), Ice dielectrics, Simulation, Ice crystal collision, Surface roughness

51-3396

Multifractality of snowflakes.

Wolf, M., *Fractals*, Dec. 1996, 4(4), p.477-493, 31 refs.

Snow crystal structure, Snow crystal growth, Snowflakes, Fractals, Mathematical models, Simulation, Statistical analysis, Classifications, Spectra, Computerized simulation, Theories

51-3397

Evidence that ozone exposure increases the susceptibility of plants to natural frosting episodes.

Foot, J.P., Caporn, S.J.M., Lee, J.A., Ashenden, T.W., *New phytologist*, Feb. 1997, 135(2), p.369-374, 29 refs.

Ecosystems, Plant ecology, Frost, Cold tolerance, Air pollution, Simulation, Ozone, Exposure, Vapor diffusion, Plant tissues, Damage, Environmental tests, Statistical analysis, Frost resistance

51-3398

Trapping of methanol, hydrogen cyanide, and *n*-hexane in water ice, above its transformation temperature to the crystalline form.

Notesco, G., Bar-Nun, A., *Icarus*, Apr. 1997, 126(2), p.336-341, 26 refs.

Extraterrestrial ice, Ice physics, Gases, Ice sublimation, Ice vapor interface, Vapor diffusion, Satellites (natural), Thermodynamic properties, Temperature effects, Hydrocarbons, Clathrates, Hydrates, Simulation, Geochemistry

51-3399

Model for the changing pore structure and dust grain size distribution in a porous comet nucleus.

Shoshani, Y., Heifetz, E., Prialnik, D., Podolak, M., *Icarus*, Apr. 1997, 126(2), p.342-350, 25 refs.

Extraterrestrial ice, Slush, Porosity, Amorphous ice, Ice physics, Ice sublimation, Particle size distribution, Vapor diffusion, Dust, Wave propagation, Fluid dynamics, Permeability, Mathematical models

51-3400

Light scattering by dense clusters of spheres.

Lumme, K., Rahola, J., Hovenier, J.W., *Icarus*, Apr. 1997, 126(2), p.455-469, 30 refs.

Cosmic dust, Extraterrestrial ice, Aggregates, Light scattering, Albedo, Ice optics, Mathematical models, Simulation, Topographic effects, Statistical analysis

51-3401

General circulation model simulation of the Martian polar warming.

Wilson, R.J., *Geophysical research letters*, Jan. 15, 1997, 24(2), p.123-126, 20 refs.

Mars (planet), Climatology, Polar atmospheres, Air temperature, Atmospheric circulation, Atmospheric composition, Dust, Storms, Advection, Mass transfer, Heat flux, Global warming, Seasonal variations, Simulation, Thermal analysis

51-3402

Rainwater composition in eight arctic catchments in northern Europe (Finland, Norway and Russia).

Reimann, C., et al, *Atmospheric environment*, Jan. 1997, 31(2), p.159-170, 20 refs.

Polar atmospheres, Precipitation (meteorology), Rain, Chemical composition, Chemical analysis, Sampling, Mining, Air pollution, Aerosols, Metals, Environmental impact, Statistical analysis, Seasonal variations, Correlation, Finland, Russia, Norway

51-3403

Horizontal cross flow filtration and rinsing of ice from saline slurries.

Dickey, L.C., Dallmer, M.F., Radewonuk, E.R., McAloon, A., *Canadian journal of chemical engineering*, Dec. 1996, 74(6), p.905-910, With French summary. 12 refs.

Water supply, Water chemistry, Water treatment, Desalting, Slush, Brines, Ice water interface, Channels (waterways), Suspended sediments, Coalescence, Ice water interface, Filters, Leaching

51-3404

Genetic variation in populations of the arctic perennial *Pedicularis dasyantha* (Scrophulariaceae), on Svalbard, Norway.

Odasz, A.M., Savolainen, O., *American journal of botany*, Nov. 1996, 83(11), p.1379-1385, 53 refs.

Subpolar regions, Plant ecology, Grasses, Distribution, Plant tissues, Variations, Viability, Chemical analysis, Vegetation patterns, Norway—Svalbard

51-3405

Physiological and growth response of arctic plants to a field experiment simulating climatic change.

Chapin, F.S., III, Shaver, G.R., *Ecology*, Apr. 1996, 77(3), p.822-840, 78 refs.

Plant ecology, Plant physiology, Ecosystems, Tundra vegetation, Phenology, Climatic changes, Global warming, Biomass, Growth, Light effects, Temperature effects, Nutrient cycle, Environmental tests, Simulation

51-3406

GCM simulation of the climate 6000 years ago.

Hall, N.M.J., Valdes, P.J., *Journal of climate*, Jan. 1997, 10(1), p.3-17, 35 refs.

Paleoclimatology, Simulation, Mathematical models, Insolation, Atmospheric circulation, Air temperature, Temperature variations, Seasonal variations, Statistical analysis, Hydrologic cycle, Theories

Two 10-yr integrations of the U.K. Universities Global Atmospheric Modelling Programme General Circulation Model are presented. Each has a full seasonal cycle, T42 resolution, interactive land and sea ice for both polar regions, and prescribed sea surface temperatures. They differ in that one integration represents present day climate and the other has a perturbed orbit and reduced atmospheric concentrations of CO_2 appropriate to the climate of 6000 years ago. The 6k integration produces enhanced continental warmth during summer and cold during winter. Changes in atmospheric temperature gradients brought about by the surface response lead to altered jet stream structures and transient eddy activity, which in turn affect precipitation patterns. (Auth. mod.)

51-3407

Global cloud liquid water path simulations.

Lemus, L., Rikus, L., Martin, C., Platt, R., *Journal of climate*, Jan. 1997, 10(1), p.52-64, 39 refs.

Climatology, Cloud cover, Cloud physics, Water content, Optical properties, Climatic factors, Ice formation, Ice crystals, Temperature effects, Weather forecasting

51-3408

Efficient approach to modeling the topographic control of surface hydrology for regional and global climate modeling.

Stieglitz, M., Rind, D., Famiglietti, J., Rosenzweig, C., *Journal of climate*, Jan. 1997, 10(1), p.118-137, 67 refs.

Climatology, Hydrologic cycle, Watersheds, Saturation, Topographic effects, Soil water migration, Runoff forecasting, Snow hydrology, Snow cover effect, Snowmelt, Snow water equivalent, Simulation, Mathematical models

51-3409

Properties and classification of cold desert soils from Antarctica.

Bockheim, J.G., *Soil Science Society of America. Journal*, Jan.-Feb. 1997, 61(1), p.224-231, 29 refs.

Geocryology, Permafrost weathering, Soil analysis, Periglacial processes, Geochemistry, Chemical properties, Weathering, Sampling, Classifications, Cryoturbation, Desert soils, Soil classification

Eight pedons representing three climatic zones and parent materials ranging from Holocene to Pliocene were characterized from the Dry Valleys region of Antarctica. All of the soils contain abundant water-soluble salts, including NaCl in coastal regions, $NaNO_3$ along the polar plateau, and Na_2SO_4 in intermediate areas. The salts originate primarily from atmospheric deposition and accumulate linearly with

time. Although the soils bear many features of Aridisols, they fail to meet the requirements of an aridic soil moisture regime because of the very cold temperatures. They could be classified as Cryids if the Aridisols suborder were expanded to include soils with temperatures that never exceed 5 to 8°C. In the proposed Gelisols order for permafrost-affected soils, the soils are classified as Natric, Glacic, and Typic Anhyturbels (evidence of cryoturbation) and Salic and Petrosalic Anhyhaplels (no cryoturbation). (Auth. mod.)

51-3410
Improve online freeze and cloud point control.
Davidson, F., Tsang, C., *Hydrocarbon processing,* Jan. 1997, 76(1), p.95-98, 1 ref.
Hydrocarbons, Petroleum industry, Fuels, Freezing points, Temperature control, Chemical analysis, Specifications, Accuracy, Low temperature research

51-3411
Swell wave propagation in an inhomogeneous ice sheet.
Marchenko, A.V., *Fluid dynamics,* Sep.-Oct. 1996, 31(5), p.761-767, Translated from Akademiĭ nauk. Izvestiia. Mekhanika zhidkosti i gaza. 14 refs.
Sea ice, Ice mechanics, Oscillations, Gravity waves, Spectra, Ice water interface, Wave propagation, Ice cracks, Pressure ridges, Flexural strength, Ice elasticity, Hydrodynamics, Mathematical models

51-3412
Edge function analysis of glacier mechanics problems.
Dwyer, J.F., Amadei, B., Lin, C.T., Pfeffer, W.T., *International journal of solids and structures,* Mar. 1997, 34(8), p.991-1005, 23 refs.
Glaciology, Ice mechanics, Ice deformation, Anisotropy, Boundary value problems, Mathematical models, Stress concentration, Crevasses, Ice deterioration, Calving

51-3413
Modeling of the AC arc discharge on ice surfaces.
Farzaneh, M., et al, *IEEE transactions on power delivery,* Jan. 1997, 12(1), p.325-338, Includes discussion and reply. 41 refs.
Power line icing, Ice electrical properties, Electrical resistivity, Insulation, Ice accretion, Charge transfer, Ice cover effect, Ice solid interface, Simulation, Mathematical models

51-3414
Unified creep model of frozen soil under uniaxial compressive stress.
Sheng, Y., Wu, Z.W., Miao, L.N., Ma, W., *Progress in natural science,* Feb. 1997, 7(1), p.63-67, 6 refs.
Geocryology, Rheology, Frozen ground strength, Soil creep, Mathematical models, Indexes (ratios), Strains

51-3415
Survey and partial characterization of ice-nucleating fluids secreted by giant-rosette (*Lobelia* and *Dendrosenecio*) plants of the mountains of eastern Africa.
Embuscado, M.E., BeMiller, J.N., Knox, E.B., *Carbohydrate polymers,* Sep.-Oct.1996, 31(1-2), p.1-9, 21 refs.
Plant physiology, Ice formation, Solutions, Nucleation, Polymers, Supercooling, Chemical analysis, Frost resistance, Statistical analysis

51-3416
Irish Quaternary Fauna Project.
Woodman, P., McCarthy, M., Monaghan, N., *Quaternary science reviews,* Mar. 1997, 16(2), p.129-159, Refs. p.157-159.
Pleistocene, Paleoecology, Quaternary deposits, Geochronology, Radioactive age determination, Sampling, Animals, Migration, Ireland

51-3417
Use of oxygen and carbon isotope composition of pedogenic carbonates from Pleistocene palaeosols in NW Bangladesh, as palaeoclimatic indicators.
Alam, M.S., Keppens, E., Paepe, R., *Quaternary science reviews,* Mar. 1997, 16(2), p.161-168, 26 refs.
Pleistocene, Quaternary deposits, Paleoclimatology, Climatic changes, Paleoecology, Chemical analysis, Oxygen isotopes, Carbon isotopes, Isotope analysis, Soil profiles, Lithology, Stratigraphy, Statistical analysis, Bangladesh

51-3418
Subglacial hydrology in north-western Germany during the last glaciation: groundwater flow, tunnel valleys and hydrological cycles.
Piotrowski, J.A., *Quaternary science reviews,* Mar. 1997, 16(2), p.169-185, Refs. p.183-185.
Pleistocene, Glacial hydrology, Subglacial drainage, Ground water, Meltwater, Water erosion, Glacier beds, Tunnels, Hydrologic cycle, Hydrogeology, Quaternary deposits, Mathematical models, Germany

51-3419
Mechanisms forcing abrupt fluctuations of the Indian Ocean summer monsoon during the last deglaciation.
Zoneveld, K.A.F., Ganssen, G., Troelstra, S., Versteegh, G.J.M., Visscher, H., *Quaternary science reviews,* Mar. 1997, 16(2), p.187-201, Refs. p.196-198.
Paleoclimatology, Pleistocene, Paleoecology, Quaternary deposits, Marine deposits, Climatic changes, Ice cover effect, Precipitation (meteorology), Paleoecology, Periodic variations, Insolation, Climatic factors, Indian Ocean

51-3420
Diatom record of climate and hydrology for the past 200 KA from Owens Lake, California with comparison to other Great Basin records.
Bradbury, J.P., *Quaternary science reviews,* Mar. 1997, 16(2), p.203-219, Refs. p.217-219.
Paleoclimatology, Paleoecology, Limnology, Pleistocene, Lacustrine deposits, Quaternary deposits, Plankton, Classifications, Biomass, Remanent magnetism, Geochronology, United States—California—Owens Lake

51-3421
Fluctuations of the Weichselian ice sheet in SW Iceland: a glaciomarine sequence from Sudurnes, Seltjarnarnes.
Eiríksson, J., Símonarson, L.A., Knudsen, K.L., Kristensen, P., *Quaternary science reviews,* Mar. 1997, 16(2), p.221-240, Refs. p.239-240.
Pleistocene, Ice sheets, Glaciation, Glacier oscillation, Glacial deposits, Marine deposits, Quaternary deposits, Stratigraphy, Radioactive age determination, Geochronology, Ice dating, Correlation, Iceland

51-3422
Configurational entropy in the Jaccard theory of the electrical properties of ice.
Ryzhkin, I.A., Whitworth, R.W., *Journal of physics—condensed matter,* Jan. 13, 1997, 9(2), p.395-402, 23 refs.
Ice physics, Molecular structure, Defects, Ice electrical properties, Ice dielectrics, Molecular energy levels, Proton transport, Hydrogen bonds, Ice models, Theories, Mathematical models, Statistical analysis

51-3423
Chemical contamination of antarctic snow: the case of lead.
Scarponi, G., Barbante, C., Turetta, C., Gambaro, A., Descon, P., *Microchemical journal,* Jan. 1997, 55(1), p.24-32, 26 refs.
Polar atmospheres, Climatology, Air pollution, Snow composition, Snow impurities, Sampling, Aerosols, Fallout, Environmental tests, Periodic variations, Fuels

Snow samples were collected from surface layers of the Hercules Névé (Victoria Land, East Antarctica) during the austral summer 1993-94 in the framework of the Italian Scientific Expeditions to Antarctica. Lead concentration was determined directly on melted snow and without any preconcentration step by differential pulse anodic stripping voltammetry inside a clean chemistry laboratory (Class 100). Metal fallout fluxes were calculated using corresponding annual accumulation rates. Results showed that during the previous decade the lead content of antarctic snow had decreased markedly. This trend, which confirms previous results obtained in other sites of Victoria Land has been related to the corresponding decrease in the consumption of lead as a gasoline additive in the countries of the Southern Hemisphere. (Auth. mod.)

51-3424
Comparison of *In Situ* and Landsat Thematic Mapper derived snow grain characteristics in the Alps.
Fily, M., Bourdelles, B., Dedieu, J.P., Sergent, C., *Remote sensing of environment,* Mar. 1997, 59(3), p.452-460, 25 refs.
Snow cover structure, Grain size, Snow surveys, Alpine landscapes, Remote sensing, Snow optics, LANDSAT, Reflectivity, Sampling, Models, Correlation, Accuracy

51-3425
Differences in arctic tundra vegetation type and phenology as seen using bidirectional radiometry in the early growing season.
Vierling, L.A., Deering, D.W., Eck, T.F., *Remote sensing of environment,* Apr. 1997, 60(1), p.71-82, 40 refs.
Arctic landscapes, Tundra terrain, Tundra vegetation, Ecosystems, Vegetation patterns, Classifications, Remote sensing, Radiometry, Albedo, Spectroscopy, Phenology, Resolution

51-3426
Mapping seasonal snow with SIR-C/X-SAR in mountainous areas.
Shi, J.C., Dozier, J., *Remote sensing of environment,* May 1997, 59(2), p.294-307, 36 refs.
Snow surveys, Alpine landscapes, Snow cover distribution, Snow cover structure, Classifications, Wet snow, Spaceborne photography, Synthetic aperture radar, Sensor mapping, Backscattering, Image processing, Snow cover effect, Correlation

51-3427
Kinks and cracks in S1 ice under across-column compression.
Manley, M.E., Schulson, E.M., *Philosophical magazine letters,* Feb. 1997, 75(2), p.83-90, 14 refs.
Ice mechanics, Compressive properties, Mechanical tests, Ice solid interface, Loading, Ice deformation, Cracking (fracturing), Crack propagation, Orientation, Nucleation

51-3428
Use of transparent insulation in low energy dwellings in cold climates.
Lien, A.G., Hestnes, A.G., Aschehoug, Ø, *Solar energy,* Jan.-Mar. 1997, 59(1-3), p.27-35, 3 refs.
Houses, Air temperature, Insulation, Temperature control, Solar radiation, Heat sources, Construction materials, Porous materials, Polymers, Cold weather performance, Transparence, Light transmission

51-3429
Comments on "A new look at the Israeli cloud seeding experiments".
Woodley, W.L, et al, *Journal of applied meteorology,* Mar. 1997, 36(3), p.250-279, Includes reply. Var. refs. For pertinent paper see 49-5248.
Cloud physics, Cloud seeding, Weather modification, Ice formation, Time factor, Ice air interface, Supercooling, Simulation, Accuracy, Statistical analysis

51-3430
Structure of Florida thunderstorms using high-altitude aircraft radiometer and radar observations.
Heymsfield, G.M., et al, *Journal of applied meteorology,* Oct. 1996, 35(10), p.1736-1762, Refs. p.1761-1762.
Precipitation (meteorology), Thunderstorms, Aerial surveys, Radar echoes, Radiometry, Convection, Ice crystals, Layers, Ice detection, Reflectivity, Weather forecasting, Statistical analysis

51-3431
Method for combined passive-active microwave retrievals of cloud and precipitation profiles.
Olson, W.S., Kummerow, C.D., Heymsfield, G.M., Giglio, L., *Journal of applied meteorology,* Oct. 1996, 35(10), p.1763-1789, Refs. p.1788-1789.
Climatology, Cloud physics, Precipitation (meteorology), Weather forecasting, Radiometry, Radiation balance, Brightness, Radar echoes, Snow pellets, Ice detection, Ice crystals, Ice optics, Profiles, Models, Statistical analysis

51-3432

Epicuticular wax of subarctic Scots pine needles: response to sulphur and heavy metal deposition.

Turunen, M., Huttunen, S., Percy, K.E., McLaughlin, C.K., Lamppu, J., *New phytologist,* Mar. 1997, 135(3), p.501-515, Refs. p.513-515.

Trees (plants), Plant physiology, Plant tissues, Subarctic landscapes, Air pollution, Aerosols, Exposure, Wettability, Fallout, Metals, Environmental impact, Environmental tests

51-3433

Fluctuations of local glaciers 30-8 KA BP: overview.

Clapperton, C.M., *Quaternary international,* Feb.-Mar. 1997, Vol.38/39, p.3-6, 36 refs.

Pleistocene, Glaciation, Glacier oscillation, Glacial deposits, Radioactive age determination, Quaternary deposits, Geochronology

51-3434

Latest Pleistocene and Early Holocene fluctuations of glaciers in the Canadian and northern American Rockies.

Osborn, G., Gerloff, L., *Quaternary international,* Feb.-Mar. 1997, Vol.38/39, p.7-19, Refs. p.18-19.

Pleistocene, Mountain glaciers, Glacier oscillation, Quaternary deposits, Glacial geology, Moraines, Stratigraphy, Geomorphology, Lacustrine deposits, Radioactive age determination, Geochronology, Canada—Rocky Mountains, United States—Rocky Mountains

51-3435

Timing and significance of the Late-Glacial and Holocene cirque glaciation in the Sierra Nevada, California.

Clark, D.H., Gillespie, A.R., *Quaternary international,* Feb.-Mar. 1997, Vol.38/39, p.21-38, Refs. p.37-38.

Pleistocene, Paleoclimatology, Glacial geology, Quaternary deposits, Glacier oscillation, Snow line, Moraines, Cirque glaciers, Alpine glaciation, Lacustrine deposits, Radioactive age determination, Stratigraphy, Correlation, United States—California—Sierra Nevada

51-3436

Glacier fluctuations in the eastern Andes of Colombia (South America) during the last 45,000 radiocarbon years.

Helmens, K.F., Rutter, N.W., Kuhry, P., *Quaternary international,* Feb.-Mar. 1997, Vol.38/39, p.39-48, 22 refs.

Pleistocene, Mountain glaciers, Glacier oscillation, Moraines, Glacial geology, Quaternary deposits, Radioactive age determination, Geochronology, Oxygen isotopes, Isotope analysis, Correlation, Colombia—Andes

51-3437

Late Quaternary glacier advances and palaeolake highstands in the Bolivian Altiplano.

Clapperton, C.M., Clayton, J.D., Benn, D.I., Marden, C.J., Argollo, J., *Quaternary international,* Feb.-Mar. 1997, Vol.38/39, p.49-59, 42 refs.

Pleistocene, Glaciation, Limnology, Geomorphology, Paleoclimatology, Climatic changes, Lacustrine deposits, Quaternary deposits, Moraines, Stratigraphy, Radioactive age determination, Correlation, Bolivia—Andes

51-3438

Late-Glacial fluctuations of South Patagonian icefield, Torres Del Pain National Park, southern Chile.

Marden, C.J., *Quaternary international,* Feb.-Mar. 1997, Vol.38/39, p.61-68, 45 refs.

Pleistocene, Paleoclimatology, Climatic changes, Glacier oscillation, Moraines, Geomorphology, Quaternary deposits, Glacial geology, Radioactive age determination, Geochronology, Chile—Torres del Paine

51-3439

Late-Glacial and early Holocene glacier activity in the Southern Alps, New Zealand.

Fitzsimons, S.J., *Quaternary international,* Feb.-Mar. 1997, Vol.38/39, p.69-76, 54 refs.

Pleistocene, Alpine glaciation, Mountain glaciers, Glacier oscillation, Stratigraphy, Classifications, Moraines, Quaternary deposits, Radioactive age determination, Geochronology, New Zealand—Southern Alps

51-3440

Late Pleistocene, Late-Glacial and Holocene glacier advances on the Tibetan Plateau.

Lehmkuhl, F., *Quaternary international,* Feb.-Mar. 1997, Vol.38/39, p.77-83, 52 refs.

Pleistocene, Mountain glaciers, Glaciation, Moraines, Quaternary deposits, Stratigraphy, Outwash, Lacustrine deposits, Radioactive age determination, Geochronology, China—Tibet

51-3441

Quaternary glacial history of the Karakoram Mountains and northwest Himalayas: a review.

Derbyshire, E., Owen, L.A., *Quaternary international,* Feb.-Mar. 1997, Vol.38/39, p.85-102, Refs. p.101-102.

Pleistocene, Mountain glaciers, Glaciation, Glacier oscillation, Quaternary deposits, Geochronology, Geomorphology, Stratigraphy, Pakistan—Karakoram Mountains, India—Himalaya Mountains

51-3442

Fluctuations of local glaciers in the southern ranges of the Former USSR: 18,000-8000 BP.

Bondarev, L.G., Gobedzhishvili, R.G., Solomina, O.N., *Quaternary international,* Feb.-Mar. 1997, Vol.38/39, p.103-108, 36 refs.

Pleistocene, Glacier oscillation, Geochronology, Geomorphology, Glaciation, Distribution, Russia

51-3443

LGM and Late-Glacial fluctuations in the Eastern Alps.

van Husen, D., *Quaternary international,* Feb.-Mar. 1997, Vol.38/39, p.109-118, 25 refs.

Pleistocene, Alpine glaciation, Glacier oscillation, Glaciation, Glacier ablation, Geochronology, Palynology, Quaternary deposits, Stratigraphy, Austria—Alps

51-3444

Periglacial trimlines in the Scottish Highlands.

Ballantyne, C.K., *Quaternary international,* Feb.-Mar. 1997, Vol.38/39, p.119-136, Refs. p.134-136.

Pleistocene, Glaciation, Ice edge, Altitude, Geomorphology, Glacial erosion, Periglacial processes, Bedrock, Frost weathering, Nunataks, Radioactive isotopes, Isotope analysis, Radioactive age determination, United Kingdom—Scotland

51-3445

Glacier fluctuations in western Scotland.

Benn, D.I., *Quaternary international,* Feb.-Mar. 1997, Vol.38/39, p.137-147, Refs. p.145-147.

Pleistocene, Ice sheets, Ice edge, Glacier oscillation, Glaciation, Quaternary deposits, Radioactive age determination, Geochronology, Climatic factors, United Kingdom—Scotland

51-3446

Observations of the annual cycle of sea ice temperature and mass balance.

Perovich, D.K., Elder, B.C., Richter-Menge, J.A., MP 4013, *Geophysical research letters,* Mar. 1, 1997, 24(5), p.555-558, 14 refs.

Oceanography, Sea ice, Ice temperature, Mass balance, Temperature measurement, Seasonal variations, Thermistors, Ice deterioration, Snow thermal properties, Thermal conductivity, Snow cover effect

A vertical array of thermistors coupled with an autonomous datalogging system was used to obtain a 15-month record of ice temperature profiles in a multiyear floe in the Beaufort Sea. This record was used to monitor atmosphere, ice and ocean temperatures, determine changes in the ice mass balance, and infer estimates of the ocean heat flux and the snow thermal conductivity. Ablation during the summer melt season consisted of approximately 0.3 m of snow melt, 0.67 m of ice surface ablation and 0.25 m of bottom ablation. There was 0.45 m of bottom accretion during the growth season. The annually averaged ocean heat flux was 4 W/m^2, with a summertime value of 9 W/m^2. Comparing these results to earlier studies conducted in the same region showed considerable interannual variability in summer melting. The thermal conductivity of snowcover was approximately 0.3 W/m/K during winter. (Auth.)

51-3447

Long-term stratospheric monitoring activities at a European arctic research site.

Rummukainen, M., Kyrö, E., *Physics and chemistry of the earth,* Feb. 1995, 20(1), p.33-38, 13 refs.

Climatology, Climatic changes, Stratosphere, Polar atmospheres, Atmospheric composition, Aerosols, Ozone, Air pollution, Environmental impact, Environmental protection, Monitors, Lidar, Sounding

51-3448

Stratospheric ozone studies at the UKMO: recent history and five year research strategy.

Austin, J., *Physics and chemistry of the earth,* Feb. 1995, 20(1), p.39-52, 30 refs.

Climatology, Polar atmospheres, Stratosphere, Ozone, Aerosols, Atmospheric density, Air pollution, Research projects, Environmental impact

The recent achievements of the U.K. Meteorological Office stratospheric ozone research program will first be briefly described. The development of trajectory methods, to establish rigorous comparisons between chemical observations and model results, have led to the investigation of coupling processes such as the influence of planetary waves on the antarctic ozone hole and the possibility through CO_2 increase of an arctic ozone hole. Such process studies have been continued with a recent investigation of the effect of the quasi-biennial oscillation and chlorine loading on the interannual variability of the antarctic ozone hole. Over the next 5 years such stratospheric research will concentrate on theory and modelling, and will continue to be coordinated between chemistry and dynamics. The emphasis will be on quantitative modelling and diagnostic studies. (Auth. mod.)

51-3449

STRATÉOLE: a project to study antarctic polar vortex dynamics and its impact on ozone chemistry.

Vial, F., et al, *Physics and chemistry of the earth,* Feb. 1995, 20(1), p.83-96, 25 refs.

Climatology, Polar atmospheres, Stratosphere, Atmospheric circulation, Turbulent diffusion, Aerosols, Ozone, Degradation, Research projects, Sounding, Radiometry, Environmental protection

The STRATÉOLE experiment is designed to study the wintertime antarctic lower stratosphere polar vortex and its springtime breakdown. To this end, it is planned to fly a large number of long-lived (3 months), small isopycnic drifting balloons instrumented with temperature and pressure sensors, GPS and transmitters. The main goal of STRATÉOLE experiment is to provide an unprecedented documentation of the wind field in the vicinity of the vortex edge in order to study vortex porosity and erosion, filamentation and mixing properties of the air masses. (Auth. mod.)

51-3450

Chemistry and aerosol measurements on the Geophysika stratospheric research aircraft: the Airborne Polar Experiment.

Borrmann, S., Stefanutti, L., Khattatov, V., *Physics and chemistry of the earth,* Feb. 1995, 20(1), p.97-101, 9 refs.

Polar atmospheres, Climatology, Atmospheric composition, Sounding, Aircraft, Design, Measuring instruments, Polar stratospheric clouds, Aerosols, Air pollution, Research projects

51-3451

POLECAT: preparatory and modelling studies.

Peter, T., Müller, R., Pawson, S., Volkert, H., *Physics and chemistry of the earth,* Feb. 1995, 20(1), p.109-121, Refs. p.120-121.

Climatology, Research projects, Polar atmospheres, Air flow, Aerial surveys, Polar stratospheric clouds, Aerosols, Cloud physics, Degradation, Ozone, Heterogeneous nucleation, Models, Environmental tests

51-3452

Impact of aircraft emissions on stratospheric ozone: a research strategy.

Kärcher, B., Peter, T., *Physics and chemistry of the earth,* Feb. 1995, 20(1), p.123-131, 39 refs.

Climatology, Air pollution, Condensation trails, Aircraft, Stratosphere, Ozone, Aerosols, Degradation, Heterogeneous nucleation, Ice crystal structure, Environmental impact, Research projects

51-3453
Secondary environmental impacts of winter salting. [Sekundär miljöpåverkan av vintersaltning]
Gustavsson, E., Yakoub, J., *Sweden. Statens väg- och transportforskningsinstitutet. VTI meddelande,* 1996, No.798, 35p. with appends., In Swedish with English summary. 16 refs.
Road maintenance, Salting, Vehicles, Winter maintenance, Runoff, Mass transfer, Environmental impact, Human factors, Statistical analysis

51-3454
Preliminary results from the lichenometric study of the Nautardáur rock glacier, Tröllaskagi, northern Iceland.
Hamilton, S.J., Whalley, W.B., *Geomorphology,* May 1955, 12(2), p.123-132, 34 refs.
Rock glaciers, Lichens, Geochronology, Iceland

51-3455
Rock glacier nomenclature: a re-assessment.
Hamilton, S.J., Whalley, W.B., *Geomorphology,* Oct. 1995, 14(1), p.73-80, 49 refs.
Rock glaciers, Classifications, Geomorphology, Terminology

51-3456
Glacial valley cross-profile development: the influence of in situ rock stress and rock mass strength, with examples from the Southern Alps, New Zealand.
Augustinus, P.C., *Geomorphology,* Nov. 1995, 14(2), p.87-97, 52 refs.
Glacial geology, Rock mechanics, Slope stability, Geologic structures, Geomorphology, New Zealand—Southern Alps

51-3457
Hypsometric forcing of stagnant ice margins: Pleistocene valley glaciers, San Juan Mountains, Colorado.
Small, E.E., *Geomorphology,* Nov. 1995, 14(2), p.109-121, 49 refs.
Ice edge, Ice models, Alpine glaciation, Mountain glaciers, Glacial geology, Pleistocene, United States—Colorado—San Juan Mountains

51-3458
Modelling of icecap glaciation of the northern Rocky Mountains of Montana.
Locke, W.W., *Geomorphology,* Nov. 1995, 14(2), p.123-130, 22 refs.
Alpine glaciation, Models, Ice sheets, Glacial geology, Glacier oscillation, Paleoclimatology, United States—Montana—Rocky Mountains

51-3459
Diversion of the upper Bear River: glacial diffluence and Quaternary erosion, Sierra Nevada, California.
James, L.A., *Geomorphology,* Nov. 1995, 14(2), p.131-148, 37 refs.
Mountains, Quaternary deposits, Glacial erosion, Glacier flow, United States—California—Sierra Nevada

51-3460
Channel change in relation to meltwater flooding, Bas Glacier d'Arolla, Switzerland.
Warburton, J., *Geomorphology,* Dec. 1994, 11(2), p.141-149, 13 refs.
Channels (waterways), Glacial rivers, Meltwater, Flooding, Switzerland

51-3461
Paraglacial redistribution of glacial sediments in Vestfold Hills, East Antarctica.
Fitzsimons, S.J., *Geomorphology,* Mar. 1996, 15(2), p.93-108, 25 refs.
Glacial geology, Geomorphology, Sediments, Glacial deposits, Periglacial processes, Sediment transport, Antarctica—Vestfold Hills
Observations of late Quaternary glaciation and deglaciation of the area and contemporary depositional processes are reported, and a conceptual model of geomorphological change since deglaciation is presented. The model attempts to reconcile the types and rates of contemporary depositional processes with the distribution of deposits and landforms, and to explain why unconsolidated deposits cover less than 20% of the Hills despite the effects of recent glaciation. The lack of unconsolidated deposits in the landscape can be attributed to the combined effects of low debris volumes in the ice and the redistribution of debris during and after deglaciation. Redistribution of debris can be explained by paraglacial processes which are non-glacial sedimentary processes that are directly conditioned by glaciation. Paraglacial sedimentation is a response to rapid adjustment of the debris system after the dominance of glacial conditions, and is characterized by disequilibrium between sediment supply and transportation of sediment by nonglacial processes. Evidence from the Vestfold Hills suggests paraglacial sedimentary processes are dominated by mass movement of glacial debris from slopes and the formation of stable valley fills, and that the main sediment transfers occur within a few thousand years of deglaciation. (Auth. mod.)

51-3462
Blockfields, old or new? Evidence and implications from some plateaus in northern Norway.
Rea, B.R., Whalley, W.B., Rainey, M.M., Gordon, J.E., *Geomorphology,* Mar. 1996, 15(2), p.109-121, 42 refs.
Geologic structures, Glacial till, Weathering, Geochemistry, Clay minerals, Norway

51-3463
Glacial and periglacial deposits of the Tumbledown Cliffs area, James Ross Island, West Antarctica.
Lundqvist, J., Lillieskold, M., Östmark, K., *Geomorphology,* Feb. 1995, 11(3), p.205-214, 23 refs.
Glacial geology, Periglacial processes, Glacial deposits, Cirque glaciers, Frost action, Antarctica—James Ross Island, Antarctica—Tumbledown Cliffs
Investigations of the glacial geology of an ice-free area between local glaciers on western James Ross I. have shown that recent glaciation consists of small cirque glaciers and outlet glaciers from the central icefields. Erratics are evidence of an earlier, more widespread glaciation. Two till types are found in the area, a thin, erratic-bearing older diamicton interpreted as a lodgement till or a glaciotectonite and a younger, local till of supraglacial origin forming the recent terminal moraines. The present grounding line lies close to the sea level, resulting in subglacial deposition. A former more extended glacier was grounded further out in the Prince Gustav Channel. Frost action is intense in the cold, continental climate and large volumes of talus are produced. Rock glaciers are common, probably of both talus and glacier derived origin. The glacial and periglacial features, including a kame terrace and a raised beach, imply that the area has been ice-free throughout the Holocene and possibly longer. (Auth.)

51-3464
Rock weathering processes and landform development in the Sør Rondane Mountains, Antarctica.
Matsuoka, N., *Geomorphology,* July 1995, 12(4), p.323-339, 60 refs.
Rocks, Weathering, Landforms, Freeze thaw cycles, Frost weathering, Antarctica—Sør Rondane Mountains
Field observations of weathering processes and the related landforms, combined with laboratory analyses of weathering products, permit a synthetic evaluation of Late Cenozoic weathering environments in the Sør Rondane Mountains, an arid upland characterized by low temperatures and strong winds. Rates and character of weathering depend mainly on moisture availability and the bedrock geology. Under the humid weathering regime that occurs only locally around the margin of the present ice sheet, frequent diurnal freeze-thaw cycles in summer cause relatively rapid rock fragmentation. Most of the mountains are situated in the arid weathering regime, under which rock breakdown is very slow unless the rock contains much salt. Salt weathering becomes more intensive and extensive with exposure age, as a result of salt accumulation in rock, eventually producing soils of fine-silt size. Lack of clay mineralization even in weathered rocks having been exposed above the ice sheet prior to 4 Ma indicates that hydrolysis or carbonation of rock minerals has been insignificant during the past 4 Ma. The final products of weathering are due mainly to salt action and reflect the parent lithology. Resistant fine-grained granite forms strongly oxidized tors carved with tafoni, or fields of mushroom-like boulders overlying the fractured bedrock. Less resistant rocks, such as biotite gneiss and amphibolite, produce stone pavements underlain by saline, silty soils up to 30-40 cm thick, the thickness corresponding to the maximum thaw depth. (Auth. mod.)

51-3465
Numerical modelling of the transition zone between an ice sheet and an ice shelf. [Numerische Modellierung der Übergangszone zwischen Eisschild und Schelfeis]
Mayer, C., *Berichte zur Polarforschung,* 1996, No.214, 150p., In German with English summary. Refs. p.131-138.
Ice sheets, Ice shelves, Mathematical models, Glacier flow, Antarctica—West Antarctica
The report examines the problem of the stability of the ice sheet covering West Antarctica, the ice shelf, and the glacial transition zone between them. Previous studies of the unstable nature of the region are discussed. Two- and three-D models are presented, precise definitions of finite differences are given, and experiments with the ICE-MINT model are reviewed. Ice sheet and ice shelf schematic studies are investigated. The key problem and probably the most complex is modelling the transition zone between sheet and shelf.

51-3466
Reconstruction of preglacial topography using a postglacial flooding surface: Upper Paleozoic deposits, central Transantarctic Mountains, Antarctica.
Isbell, J.L., Gelhar, G.A., Seegers, G.M., *Journal of sedimentary research,* Mar. 1997, 67(2), p.264-273, Refs. p.272-273.
Glacial geology, Glacial deposits, Tectonics, Topography, Stratigraphy, Antarctica—Transantarctic Mountains
Upper Paleozoic glacial deposits in the central Transantarctic Mountains are the basal deposits within a Late Paleozoic to Early Mesozoic basin that formed along the margin of the East Antarctic Craton. This basin was a foreland basin throughout much of its history, and was part of a larger-scale basin that stretched across the paleo-Pacific margin of Gondwanaland. A flooding surface that separates Upper Paleozoic glacial deposits from overlying postglacial black shales in the central Transantarctic Mountains is used as a datum for reconstructing the preglacial topography. The postglacial flooding surface resulted from flooding of the depositional basin following collapse of the Gondwanide ice sheet. Results using this approach aided in reevaluating the factors that controlled the formation of the depositional basin in Antarctica and in determining the tectonic setting of the paleo-Pacific margin of Antarctica during deposition of the Upper Paleozoic glacial rocks. The use of a flooding surface as a datum is a technique that may be useful for reconstructing paleotopography in other settings. (Auth. mod.)

51-3467
Filchner-Ronne Ice Shelf Programme (FRISP), Report No.10 (1996).
Oerter, H., ed, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1996, 124p., Refs. passim. For individual papers see F-57142 through F-57162 or 51-3468 through 51-3488.
Research projects, Low temperature research, Sea ice, Ice shelves, Ice sheets, Radio echo soundings, Ice cores, Ice water interface, Snow, Airborne radar, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf
This report contains 26 written summaries of 32 talks presented at the 11th International Workshop of the Filchner-Ronne Ice Shelf Programme (FRISP). The meeting was held in Stockholm, Sweden, on June 13-14, 1996. The papers collected in this volume present an overview of FRISP and of the cooperation of participating groups. The ice-shelf ocean interaction is one of the major topics, a matter of both, field investigations and modelling. Calculating the mass balance along ice streams flowing into the Ronne Ice Shelf is undertaken by various means. The work on the Berkner I. ice cores continues as well as the evaluation of shallow ice cores with respect to accumulation studies.

51-3468
Basal melt rates along the Rutford Ice Stream.
Corr, H., et al, Filchner-Ronne Ice Shelf Programme (FRISP), Report No.10 (1996), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1996, p.11-15, 2 refs.
Stream flow, Glacier thickness, Ice water interface, Ice melting, Meltwater, Velocity measurement, Glacier flow, Glacier melting, Antarctica—Rutford Ice Stream
When the Rutford Ice Stream crosses the grounding line and begins to float, it comes into contact with a water mass that is 1°C above the local pressure freezing point. The resultant melting produces a buoyant water mass that rises along the base of the ice shelf towards the ice front, helping to drive the sub-ice shelf circulation. This paper attempts to identify variations in the basal melt rate along Rutford Ice Stream over a 70 km section immediately downstream of the grounding line.

51-3469
Strain-rate trajectories and isotropic points on Filchner Ronne Ice Shelf, Antarctica.
Doake, C.S.M., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.10 (1996), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1996, p.16-22, 11 refs.
Ice shelves, Ice models, Strains, Flow rate, Stream flow, Calving, Glacier flow, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf
A finite element model of the Filchner-Ronne Ice Shelf has been used to generate the strain-rate field, using present day ice thicknesses and velocities around the grounding line. Isotropic points in the trajectories of the principal strain-rate reveal generic features of the flow pattern. Where ice streams enter the ice shelf they invariably slow down and form "stars". The grounded ice areas, such as Berkner I., Korff and Henry ice rises act as "lemons" or "monstars". A "lemon/monstar" isotropic point exists about 60 km from the ice front of Ronne Ice Shelf and there is also one at the ice front of Filch-

ner Ice Shelf. Compressive arches of strain-rates stretch across the ice fronts of both the Ronne and Filchner. Seaward of these arches both principal strain-rates are extensive. The "top" of the compressive arches seem to be associated with the minimum restriction in the ice shelf bay. Comparison with the deduced strain-rate field for the configuration of Filchner Ice Shelf before the large iceberg calving event in 1986 suggests that when the Ronne ice front calves, the new ice front will reach back to the approximate position of the "lemon/monstar" isotropic point. (Auth.)

51-3470

Continuous density measurements on the ice core B25 from Berkner Island, Antarctica.

Gerland, S., et al, Filchner-Ronne Ice Shelf Programme (FRISP), Report No.10 (1996), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1996, p.23-24, 7 refs.

Ice cores, Ice density, Measurement, Antarctica—Berkner Island

During a British-German expedition, 3 ice cores with lengths of more than 100 m were drilled at the north and south domes of Berkner I. After an 181 m long ice core was drilled on Thyssenhöhe (south dome), density against depth was measured by means of a nondestructive technique using gamma-ray beam attenuation. The absolute accuracy of a single measurement is 2%. These high resolution density measurements will be used to determine accumulation rates and they will provide a key parameter for the planned investigation of mechanical properties of firn and ice. It was possible to measure density quasi-continuously over almost the whole core due to the good core quality. The general trend of increasing density with depth is very well displayed in a figure.

51-3471

Accumulation rates along the Foundation Ice Stream, Filchner-Ronne-Schelfeis.

Graf, W., Oerter, H., Mayer, C., Lambrecht, A., Minikin, A., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.10 (1996), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1996, p.25-31, 10 refs.

Firn, Ice cores, Age determination, Streams, Ice composition, Ice accretion, Ice dating, Antarctica—Foundation Ice Stream

The authors focus on the ^{3}H dating of three firn cores, GLB-07, GLB-01 and GLB-04 and compare the ^{3}H and ECM dating at site 930. Accumulation rates along ice flow lines on the Ronne Ice Shelf, ^{18}O content of the near surface firn layers along an ice flow line on Foundation Ice Stream, and relationship between the isotopic content of the near surface layers and the 10 m firn temperature are discussed.

51-3472

Thermohaline circulation beneath and in front of Filchner Schelfeis.

Grosfeld, K., Gerdes, R., Determann, J., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.10 (1996), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1996, p.32-37, 16 refs.

Ice shelves, Meltwater, Ice water interface, Freezing rate, Melting points, Antarctica—Filchner Ice Shelf

From oceanographic transects along the Filchner-Ronne Ice Shelf edge, two major source regions for the outflow of Ice Shelf Water are known, the Ronne Depression in the west and the Filchner Depression in the east. In this paper, the authors focus on the Filchner Depression, which is believed to be more efficient with respect to Weddell Sea Bottom Water formation, since water masses colder than -2.2°C leave the ice shelf cavity. A 3-dimensional ocean general circulation model for the simulation of the thermohaline circulation beneath an ice shelf, and its interaction with the open ocean, is available.

51-3473

WAIS underbelly melting at Pine Island Glacier?

Jacobs, S., Hellmer, H., Jenkins, A., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.10 (1996), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1996, p.38-40, 11 refs.

Glacier melting, Ice sheets, Glacier mass balance, Ice water interface, Ocean currents, Antarctica—Pine Island Glacier

This article deals with processes that shape the West Antarctic Ice Sheet (WAIS) periphery. It concerns the Pine Island Glacier (PIG), which drains a catchment basin of ca. 200,000 km^2 into the SE Amundsen Sea. Circumpolar Deep Water (CDW) penetrates the deeper regions of the continental shelf along much of the Amundsen and Bellingshausen coastline, bringing water nearly 4°C above the in-situ freezing point to the 1080-m deep cavity opening. The PIG grounding line is >1200 m below sea level with a steeply-sloping base, facilitating upwelling of this CDW, which melts a mean 10-12 m/yr off the base. These values result from independent glaciological mass balance calculations, a simple salt-box model, and a 2-D numerical model of the sub-ice thermohaline circulation. With outflows well above the freezing temperature, the ocean circulation removes about half the ice that crosses the grounding line.

51-3474

Glaciological fieldwork on Rutford Ice Stream, Carlson Inlet and Evans Ice Stream.

Jenkins, A., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.10 (1996), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1996, p.41-42.

Ice melting, Drainage, Stream flow, Velocity measurement, Glacier flow, Antarctica—Rutford Ice Stream, Antarctica—Evans Ice Stream, Antarctica—Carlson Inlet

Fieldwork undertaken during Jan. and Feb. 1996 formed the concluding phase of two earlier field programs, which were started in 1993-94. Both programs were designed to gather information on the motion of the ice streams draining from Palmer Land and Ellsworth Land into the western part of Ronne Ice Shelf. The earlier program focused on Rutford Ice Stream and included the deployment of radar reflectors and a detailed studied of the shear margin, while the latter involved the establishment of radar reflectors on Carlson Inlet and Evans Ice Stream. All sites are shown in a figure.

51-3475

Oceanographical observations in Ronne entrance.

Johnson, M., Jenkins, A., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.10 (1996), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1996, p.43-46, 3 refs.

Oceanographic surveys, Ocean currents, Ice shelves, Meltwater, Ice water interface, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

The 1996 Ronne Entrance cruise south of George VI Ice Shelf (GVIIS), on the naval ice patrol ship HMS *Endurance*, measured 50 conductivity-temperature-depth (CTD) water column profiles and collected a total of more than 400 water samples for instrument calibration and tracer studies. The aim was to complete an oceanographic survey of the water masses interacting with GVIIS, to study their circulation, and investigate the evolution of meltwater derived from the ice shelf. This new data will form an addition to earlier work in Ronne Entrance and GVIIS and will be used to investigate the mechanisms that control the oceanic environment.

51-3476

ERS-1 SAR mosaic of Filchner-Ronne-Schelfeis.

Jonas, M., Vaughan, D.G., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.10 (1996), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1996, p.47-49, 3 refs.

Ice shelves, Imaging, Ice surface, Spaceborne photography, Radar, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

The interpretation of optical and radar imagery on Filchner-Ronne Ice Shelf was carried out for validation and verification of the high accurate DEM (Digital Elevation Model) derived from the ERS radar altimetry during the ESAMCA-project (Exploitation of satellite altimetry for the monitoring of climate-related change of antarctic ice shelves). An image mosaic produced from ERS-1 SAR scenes acquired, processed and interpreted by BAS and IFAG is introduced.

51-3477

Glaciological investigations in the grounding line area of the Foundation Ice Stream.

Lambrecht, A., Mayer, C., Nixdorf, U., Oerter, H., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.10 (1996), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1996, p.50-54.

Ice sheets, Glacier mass balance, Ice surface, Glacier thickness, Bottom topography, Seismic surveys, Antarctica—Foundation Ice Stream, Antarctica—Ronne Ice Shelf

The mass-balance of the Antarctic Ice Sheet, especially the outflow across the grounding line areas, is discussed. The Foundation Ice Stream (FIS) contributes a major share of the total mass flux into the eastern part of the Ronne Ice Shelf. There was still a lack of data in the grounding line area of the FIS. To fill this data gap and complete previous studies in the northern part of the eastern Ronne Ice Shelf, a glaciological and geodetic program was initiated during the *Filchner V* campaign in austral 1994-95.

51-3478

Hot water drilling on Ronne Ice Shelf 1995/96.

Makinson, K., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.10 (1996), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1996, p.55-57, 3 refs.

Ice shelves, Drilling, Thermal drills, Oceanographic surveys, Thermistors, Antarctica—Ronne Ice Shelf

During the 1995-96 field season the BAS hot water drill was used to create an access hole at Site 3, 17 km west of Korff Ice Rise. The ice was found to be 825 m thick, overlying a water column 485 m deep. CTD profiles and water samples were obtained via the access hole using slimline oceanographic probes. Finally, a permanent oceanographic mooring and thermistor cable were deployed for long term measurements.

51-3479

Modelling tidal currents beneath Filchner-Ronne Ice Shelf.

Makinson, K., Nicholls, K.W., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.10 (1996), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1996, p.58-67, 6 refs.

Ice shelves, Ice water interface, Oceanographic surveys, Tidal currents, Meltwater, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

Filchner-Ronne Ice Shelf covers an area of almost 450,000 km^2. Isolated from atmospheric forcing, it is likely that tidal currents provide the dominant source of energy for mixing water masses in the sub-ice shelf environment. The tidal model used in this work covers the area 71° to 84°S and 15° to 90°W and has a grid size of $^1/_4$° longitude by 1/15° latitude, corresponding to approximately 7-3.5 km by 7 km. Based on depth-averaged equations, the model is driven by sea surface elevation data along the boundary at 71°S and 15°W, given by a regional model that was itself driven by the Schwiderski (1980) model. The model has been used to investigate the effect of tidal activity on the interaction between the Filchner-Ronne Ice Shelf and the underlying ocean, in particular the contribution of tides to vertical mixing in the sub-ice shelf environment.

51-3480

Using DEP and ECM to produce a chronology at Berkner.

Miners, W.D., Peel, D.A., Mulvaney, R., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.10 (1996), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1996, p.68-71, 7 refs.

Ice cores, Ice dating, Electrical resistivity, Dielectric properties, Antarctica—Berkner Island

During the 1994 field season several ice cores were collected from Berkner I. Using the electrical conductivity measurement (ECM) and the dielectric profile (DEP), the ice cores from Reinwarthhöhe (R1) and Thyssenhöhe (B25) have been dated. The electrical logging started at depths of 1.65 m for Reinwarthhöhe and 1.97 m for Thyssenhöhe. To link the age at the top of the drilled ice cores to the snow surface, a combination of the snow pit stratigraphy and near surface density measurements were used. (Auth. mod.)

51-3481

Berkner Island Project: isotopic and chemical trends in the ice core data.

Mulvaney, R., et al, Filchner-Ronne Ice Shelf Programme (FRISP), Report No.10 (1996), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1996, p.72-77, 5 refs.

Ice cores, Ice dating, Ice composition, Antarctica—Berkner Island

In Jan. and Feb. 1995, two medium depth ice cores were retrieved from Berkner I. with the objective of reconstructing a high resolution record of climate and environmental change of the past millennium. The deepest of the cores (B25) that reached a depth of 182 m, was collected with an AWI electromechanical drill at a site 5 km to the south of the southern dome, Thyssenhöhe. The second core, R1, which reached 152 m, was collected using a BAS drill at the north dome, Reinwarthhöhe. An accumulation rate of about 0.2 m water at Reinwarthhöhe implies an age at the bottom of the R1 core of around 600 years, while the B25 core from Thyssenhöhe with an accumulation rate of about 0.14 m water has an age of approximately 1200 years.

51-3482

Datasets on bed topography and ice sheet altitude for numerical modelling of the Maudheimvidda Ice Sheet, East Antarctica.

Näslund, J.O., Holmlund, P., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.10 (1996), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1996, p.78-85, 14 refs.

Ice models, Mathematical models, Ice sheets, Ice surface, Mapping, Bottom topography, Paleoclimatology, Glacier surfaces, Glacier beds, Antarctica—Queen Maud Land

The purpose of modelling the ice sheet in western Queen Maud Land is twofold. The first aim is to study changes in ice sheet configuration when simulating the cooler climate of the Quaternary glacials and climates warmer than the present. This part includes a special study of the stability of the present Veststraumen ice stream. The second purpose is to investigate the age relationship between the ice sheet and the previously mapped subglacial landforms. The results will be used to test whether it is likely or not that the subglacial cir-

ques and glacial valleys have been covered by wet-based erosive ice during the Quaternary. In addition, the model results will be used for discussing the origin and age of subaerial striae on nunataks, found up to 700 m above the present ice sheet surface.

51-3483

Oceanographic measurements made at Site 3: preliminary results.

Nicholls, K.W., Makinson, K., Johnson, M.R., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.10 (1996), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1996, p.86-93, 5 refs.

Bottom topography, Ice shelves, Ice water interface, Oceanographic surveys, Ice models, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

Any changes in climate will first affect the Ronne-Filchner Ice Shelf system via the ocean. In order to predict the likely impact of past and future changes in climate on the ice shelf, numerical models must simulate the present-day sub-ice shelf oceanographic conditions accurately. Some conclusions can be drawn about the basal mass balance of the ice shelf by observing the way in which melting and freezing affect the flow of the ice. This also allows some qualitative conclusions about the water flow immediately beneath the ice shelf. However, direct oceanographic measurements are required to determine the conditions throughout the water column and to deduce water flows quantitatively. During Jan. 1996 the BAS hot-water drill was used to create an access hole through 825 m of ice at Site 3, some 17 km west of Korff Ice Rise. It was also hoped that the data would provide a test for some of the results of a three-dimensional ocean model.

51-3484

GPS observations at the grounding zone of the Foundation Ice Stream.

Riedel, B., Resnik, B., Ritter, B., Niemeier, W., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.10 (1996), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1996, p.96-101, 3 refs.

Ice shelves, Seismic surveys, Stream flow, Glacier flow, Ice surface, Radio echo soundings, Antarctica—Foundation Ice Stream

The main emphasis of the geodetic fieldwork in 1995 was the registration of geometry and its changes of the grounding line of the Foundation Ice Stream with satellite and terrestrial observations. A detailed report about the fieldwork along Foundation Ice Stream was given in FRISP report no.9. The observed grounding line not followed a flow line of Foundation Ice Stream and had an extension of 5*80 km^2 at 83° 10'S. The processing of airborne radio echo sounding data and seismic data of the AWI reveals that the grounding line is located 40 km further south than the last group of stations 950.

51-3485

Fracture mechanics of ice shelves.

Rist, M.A., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.10 (1996), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1996, p.102-105, 7 refs.

Ice shelves, Stresses, Crevasses, Ice mechanics, Ice surface, Ice cracks, Antarctica—Ronne Ice Shelf

Tensile brittle fracture in any polycrystalline material occurs because of the presence of sharp flaws or cracks. Such imperfections act to concentrate the applied stress field so that a single small crack can propagate to form a macroscopic fracture. Ice shelf crevasses are large-scale tensile fractures that must have formed from much smaller flaws. If a flaw is introduced into a large enough stress field it will propagate rapidly under elastic conditions. As the initial flaw penetrates into an ice shelf it experiences a changing stress field that normally causes it to stabilize again at some point. By quantifying this process for a typical ice shelf a useful insight can be gained into the mechanics of crevasse formation and the implications for overall ice shelf stability.

51-3486

Results of short pulse radio echo sounding on Thyssenhöhe, Berkner Island, Antarctica.

Steinhage, D., Blindow, N., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.10 (1996), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1996, p 106-109, 5 refs.

Bottom topography, Radio echo soundings, Mapping, Glacier thickness, Antarctica—Berkner Island

In this report the authors discuss the ongoing analysis of the short pulse radio echo sounding carried out in Feb. 1995 on Berkner I., focusing at the area of the Thyssenhöhe. On this southern dome, internal layers and bedrock were mapped along ten south-north oriented profiles, which are each 20 km long and have a spacing of 1 km. The rectangular area of this survey is marked in a figure.

51-3487

Measurements of velocity of Filchner-Ronne Ice Shelf.

Vaughan, D.G., Jonas, M., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.10 (1996), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1996, p.111-116, 19 refs.

Ice shelves, Glacier flow, Velocity measurement, Data processing, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

The measurement of velocity on Filchner-Ronne Ice Shelf (FRIS) is of prime importance in determining the state of balance of the ice shelf and for testing ice shelf models. Despite the obvious promise of the method, interferometric SAR has yet to yield fields of ice shelf velocity on a routine basis and for the present one is limited to using velocities calculated from more conventional methods. Here, the authors present a digest of published velocity data (92 points), together with new measurements made by measuring the displacement of features between satellite images (221 points). The datasets are in general agreement and together will give adequate coverage for many applications. (Auth.)

51-3488

Digitally generated and compressed chirp for use in an airborne radar system in Antarctica.

Walden, M.C., Corr, H.F.J., Filchner-Ronne Ice Shelf Programme (FRISP), Report No.10 (1996), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1996, p.117-122, 5 refs.

Ice shelves, Radio echo soundings, Radar, Data processing, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

The operation of the British Antarctic Survey (BAS) radar and a sample of the BAS 95-96 antarctic field season data are discussed. In particular, the advantage of using pulse compression with chirp is highlighted. A disadvantage of pulse compression techniques is the presence of long duration sidelobes before and after the main response. Sidelobes from strong reflectors may mask the main responses of weak returns. To minimize this it is necessary to use short duration pulses. For a given RF bandwidth, short duration pulses are also less susceptible to amplitude and phase errors in the system which cause unwanted spurious responses.

51-3489

Illustrated directory of Norwegian research vessels. [Illustrert norsk forskningsfartøy-register]

Norwegian National Committee on Polar Research (Norske nasjonalkomité for polarforskning). Tromsø, University. Department of Arctic Biology., Tromsø, Norges forskningsråd (Norwegian Research Council), 1996, 16p., In Norwegian with English summary.

Oceanographic ships, Icebreakers, Ice navigation, Norway

51-3490

Arctic tanker structural requirement evaluation. Supplementary work.

McCallum, J.S., Fyfe, L.G., *Transport Canada. Transportation Development Centre, Montreal. Publication*, Mar. 1996, TP 12727E, 26p. + appends., With French summary.

Tanker ships, Steels, Steel structures, Ice navigation, Ice loads, Design criteria, Standards, Structural analysis, Cost analysis

51-3491

Chemical characteristics of acid rain and snow and the effect on forests.

Taguchi, Y., et al, *Niigata University. Research Institute for Hazards in Snowy Areas. Annual report*, 1996 (Pub. 1997), No.18, p.19-32, In Japanese with English summary. 10 refs.

Snow composition, Snow impurities, Air pollution, Scavenging, Trees (plants), Plant physiology, Physiological effects, Forest land, Forest soils, Soil pollution, Japan, Czech Republic, Germany

51-3492

Dynamic properties of gravels sampled by ground freezing.

Goto, S., Nishio, S., Yoshimi, Y., *Shimizu technical research bulletin*, Mar. 1997, No.16, p.1-8, 11 refs.

Gravel, Soil freezing, Artificial freezing, Soil stabilization, Frozen ground strength, Soil strength, Soil tests, Low temperature tests

51-3493

Structural behavior of steel beam-to-column connections subjected to dynamic loads.

Terada, T., Yabe, Y., Mase, S., Sakamoto, S., *Shimizu technical research bulletin*, Mar. 1997, No.16, p.37-45, 12 refs.

Steels, Steel structures, Joints (junctions), Structural analysis, Dynamic loads, Cold stress, Thermal stresses, Strain tests, Low temperature tests

51-3494

Ice-structure interactions in medium scale field indentation tests.

Takeuchi, T., Kawamura, M., Akagawa, S., *Shimizu technical research bulletin*, Mar. 1997, No.16, p.47-53, 4 refs.

Offshore structures, Ice solid interface, Ice loads, Ice pressure, Ice cover strength, Ice deformation, Penetration tests, Impact tests, Environmental tests

51-3495

Arctic tanker risk analysis. Phase II. Overview.

Loughnane, D.V.F., et al, *Transport Canada. Transportation Development Centre, Montreal. Publication*, Oct. 1994, TP 12324E, 61p., With French summary. Refs. p.55-61.

Tanker ships, Accidents, Oil spills, Ice navigation, Route surveys, Labor factors, Human factors, Safety, Cost analysis

51-3496

Snow load analysis for Washington.

Golden, D., ed, Edwards, G., ed, Zeck, U., ed, Scholze, J.D., ed, Seattle, Structural Engineers Association of Washington, 1995, 44p. + appends., 2nd edition. 9 refs. For 1st edition see 32-4687 and 33-1200.

Snowfall, Snow loads, Buildings, Roofs, Design criteria, Building codes, Mathematical models, United States—Washington

51-3497

Building heat may reduce depth of frost penetration.

Danyluk, L., MP 4014, *American Public Works Association. APWA reporter*, Nov. 1996, 63(10), p.16,18,19, 3 refs.

Buildings, Foundations, Frost penetration, Frost protection, Thermal insulation, Heat flux, Cold weather construction

51-3498

Capillary bonding of wet surfaces—the effects of contact angle and surface roughness.

Colbeck, S.C., MP 4015, *Journal of adhesion science and technology*, 1997, 11(3), p.359-371, 7 refs.

Water films, Liquid solid interfaces, Interfacial tension, Capillarity, Adhesion, Protective coatings, Lubricants, Surface roughness

Capillary bonding of wet solids through a water film is common and important for a variety of problems. An existing experimental technique for the measurement of capillary bonding forces was improved and used to show how fractional wetted area and capillary bonding force vary with water 'tension' for glass, polyethylene, and aluminum on porous ceramic. The effects of contact angle and roughness were explored. The results show that increasing the contact angle clearly reduces the capillary bonding, but the effects of surface roughness were much more complicated. Roughness can increase or decrease capillary bonding, depending on the exact conditions.

51-3499

Glacier mass balance bulletin. Bulletin No.4 (1994-1995).

World Glacier Monitoring Service, Haeberli, W., ed, Hoelzle, M., ed, Suter, S., ed, Zurich, 1996, 89p.

Mountain glaciers, Glacier surveys, Glacier mass balance, Glacier oscillation

51-3500

Evaluation of the scintillation method for obtaining fluxes of momentum and heat.

Hill, R.J., et al, MP 4016, *U.S. National Oceanic and Atmospheric Administration. Environmental Research Laboratories. Environmental Technology Laboratory. NOAA technical memorandum*, Jan. 1997, ERL ETL-275, 55p., 20 refs.

Soil air interface, Heat flux, Atmospheric boundary layer, Atmospheric density, Atmospheric attenuation, Humidity, Wind velocity, Scintillation, Meteorological instruments

The flux of sensible heat between the surface and the atmosphere was determined from a variety of different instruments and methods. These instruments were a Bowen-ratio station, a three-axis sonic anemometer-thermometer, a single-axis sonic anemometer with a thermocouple, and scintillometers. The methods employed were, respectively, energy balance, eddy correlation, and indirect dissipation. Comparison of the resulting sensible heat fluxes shows that they are in good agreement. Momentum flux is expressed in terms of the friction velocity and was obtained from several of the instruments by different methods. Friction velocity was obtained using eddy correlation of the three-axis sonic anemometer-thermometer data. The surface roughness was obtained from this data by application of Monin-Obukhov similarity theory. Using this roughness length, friction velocity was obtained from wind speed and heat flux measured at the Bowen station by application of Monin-Obukhov similarity. Friction velocity was also obtained from the scintillometer data using the indirect dissipation method, which is an application of Monin-Obukhov similarity. Scatter in the derived roughness length depends on stability. The data suggest that the accepted Monin-Obukhov similarity relationships are inaccurate for the experiment site; this might be caused by the inhomogeneity of the surface.

51-3501

Sampling error associated with collection and analysis of soil samples at TNT-contaminated sites.

Jenkins, T.F., Grant, C.L., Brar, G.S., Thorne, P.G., Schumacher, P.W., Ranney, T.A., MP 4017, *Field analytical chemistry and technology,* 1997, 1(3), p.151-163, 25 refs.

Explosives, Waste disposal, Soil pollution, Soil tests, Soil chemistry, Chemical analysis, Statistical analysis

This study assessed short-range spatial heterogeneity of TNT concentrations in surface soils at explosives-contaminated sites. Discrete and composite samples were analyzed by both on-site colorimetric techniques and standard laboratory protocols. Three locations were sampled at each of three installations, and the results were used to estimate the relative contributions of analytical error and sampling error. Overall, this study indicates that characterization of explosives-contaminated sites with the use of a combination of composite sampling, infield sample homogenization, and on-site colorimetric analysis is an efficient method of obtaining accurate and precise mean concentration estimates that are representative of the area.

51-3502

Field method for quantifying ammonium picrate and picric acid in soil.

Thorne, P.G., Jenkins, T.F., MP 4018, *Field analytical chemistry and technology,* 1997, 1(3), p.165-170, 32 refs.

Explosives, Waste disposal, Soil pollution, Soil tests, Soil chemistry, Chemical analysis

A simple field method for the determination of ammonium picrate and picric acid in soil was developed. Picric acid is a strong acid with a pKa=0.80, and is colorless when dissolved in an organic solvent, whereas its anion (picrate) is bright yellow. Picric acid and picrate ions were extracted from undried soil by shaking with acetone; any picric acid extracted was rapidly converted to picrate in the wet acetone. Picrate was extracted from the acetone soil extracts by passing the solutions through a solid-phase anion exchanger to remove interferences. Acidified acetone was used to convert the picrate to picric acid and elute it from the ion exchanger. The absorbance of the solution at 400 nm was measured; then the picric acid was converted to the colored picrate ion by diluting the eluent with water. Absorbance at 400 nm was measured again and the concentration of picrate was obtained from the difference in the absorbance measurements, corrected for dilution. The method detection limit is 1.3 μg/g of soil. Field-contaminated soils were assayed, and the results compared favorably to those from HPLC analyses in the range of 10-4400 μg/g. The method is simple to use, can be implemented under field conditions, and complements on-site methods for TNT, RDX, and 2,4-DNT.

51-3503

Comparison of fiberglass and other polymeric well casings, Part I: susceptibility to degradation by chemicals.

Ranney, T.A., Parker, L.V., MP 4019, *Ground water monitoring and remediation,* Winter 1997, 17(1), p.97-103, 28 refs.

Soil pollution, Ground water, Water pollution, Water chemistry, Hydrogeochemistry, Chemical analysis, Well casings, Polymers

Previous research has shown that the most commonly used well casing materials—stainless steel, polyvinyl chloride (PVC), and polytetrafluoroethylene (PTFE)—are not suited for all monitoring environments and applications. This study is part of a series of experiments that were conducted to determine the suitability of four other polymeric well casing materials—acrylonitrile butadiene styrene (ABS), fluorinated ethylene propylene (FEP), fiberglass-reinforced epoxy (FRE), and fiberglass-reinforced plastic (FRP)—for use in ground water monitoring wells. In these studies, these four materials were compared with two other commonly used polymeric well casings, PVC and PTFE. Part I of these studies examines the resistance of these materials to degradation by chemicals. The two fluorinated polymers (FEP and PTFE) were not degraded by any of the test chemicals. Among the nonfluorinated products tested, FRE was the most inert. ABS was the most readily degraded material tested. By the end of the study, only the acid and alkaline solutions had little effect on ABS. FRP was more severely degraded by the organic chemicals than FRE but was less affected than PVC. FRP and FRE lost weight when exposed to the highly acidic conditions.

51-3504

Anti-icing and deicing-defrosting fluids. Lakehurst, NJ, U.S. Naval Air Engineering Center, Dec. 1989, 1p., Amendment to U.S. Department of Defense military specification, MIL-A-8243D, for which see 41-1762.

Aircraft icing, Chemical ice prevention, Specifications

51-3505

Evaluation of air-entry pressure during in situ air sparging: a potentially rapid method of feasibility assessment.

Baker, R.S., Pemmireddy, R., McKay, D., MP 4020, International Symposium on In Situ Air Sparging for Site Remediation, 1st, Las Vegas, NV, Oct. 24-24, 1996. Proceedings, Potomac, MD, International Network for Environmental Training, Inc., 1p., Abstract only.

Soil pollution, Ground water, Aeration, Waste disposal, Land reclamation

51-3506

Roof venting: how much is enough.

Cushman, T., *Journal of light construction,* Dec. 1996, p.53-54, Based on research by W. Tobiasson, J. Buska, and A. Greatorex of the U.S. Army Cold Regions Research and Engineering Laboratory, Hanover, NH.

Buildings, Roofs, Ice prevention, Ventilation, Thermal insulation, Cold weather construction

51-3507

Sizing attic ventilation to prevent ice dams.

Tobiasson, W., Buska, J., Greatorex, A., MP 4021, *Journal of light construction,* Dec. 1996, p.54.

Buildings, Roofs, Ice prevention, Ventilation, Cold weather construction

51-3508

Bryophyte vegetation and habitat gradients in the Tikhaia Bay region, Hooker Island, Franz Josef Land, arctic Russia.

Odasz, A.M., *Bryologist,* 1996, 99(4), p.407-415, 34 refs.

Plants (botany), Mosses, Plant ecology, Vegetation patterns, Subpolar regions, Sampling, Classifications, Statistical analysis, Geobotanical interpretation, Russia—Franz Josef Land

51-3509

Icelandic low cyclone activity: climatological features, linkages with NAO, and relationships with recent changes in the northern hemisphere circulation.

Serreze, M.C., Carse, F., Barry, R.G., Rogers, J.C., *Journal of climate,* Mar. 1997, 10(3), p.453-464, 37 refs.

Climatology, Subpolar regions, Marine atmospheres, Fronts (meteorology), Synoptic meteorology, Atmospheric circulation, Atmospheric circulation, Seasonal variations, Atlantic Ocean

51-3510

Role of antarctic sea ice in global climate change.

Hanna, E., *Progress in physical geography,* Dec. 1996, 20(4), p.371-401, Refs. p.397-401.

Climatology, Climatic changes, Global warming, Air ice water interaction, Ice water interface, Polynyas, Ice cover effect, Heat transfer, Sea ice distribution, Ice cover thickness, Wind factors, Seasonal variations, Models

Taking a distinct interdisciplinary focus, a critical view is presented of the current state of research concerning antarctic sea-ice/atmosphere/ocean interaction and its effect on climate on the interannual timescale, with particular regard to anthropogenic global warming. Sea-ice formation, morphology, thickness, extent, seasonality and distribution are introduced as vital factors in climatic feedbacks. Sea-ice/atmosphere interaction is next discussed, emphasizing its meteorological and topographical influences and the effects of and on polar cyclonic activity. This leads on to the central theme of sea ice in global climate change, which contains critiques of sea-ice climatic feedbacks, current findings on the representation of these feedbacks in global climatic models, and to what extent they are corroborated by observational evidence. Sea-ice/ocean interaction is particularly important. Models developed in the Arctic, where the observational network allows more reasonable validation, can be applied to the Antarctic in suitably modified form so as to account for unique features of the antarctic cryosphere. Benefits in climatic modelling will be gained by treating antarctic sea ice as a fully coupled component of global climate. (Auth. mod.)

51-3511

Holocene and recent shoreline changes on the rapidly uplifting coast of western Finland.

Ristaniemi, O., Eronen, M., Glückert, G., Rantala, P., *Journal of coastal research,* 1997, 13(2), p.397-406, 43 refs.

Shoreline modification, Isostasy, Marine geology, Sea level, Water level, Geomorphology, Finland

51-3512

Hydrocarbon provinces in the Swiss Southern Alps—a gas geochemistry and basin modelling study.

Greber, E., Leu, W., Bernoulli, D., Schumacher, M.E., Wyss, R., *Marine and petroleum geology,* Feb. 1997, 14(1), p.3-25, With Italian summary. Refs. p.22-25.

Alpine landscapes, Hydrocarbons, Natural gas, Petroleum industry, Geological surveys, Tectonics, Sedimentation, Exploration, Geophysical surveys, Geochemistry, Switzerland—Alps

51-3513

Late Mesozoic and Cenozoic evolution of the Sørvestsnaget Basin: a tectonostratigraphic mirror for regional events along the southwestern Barents Sea margin?

Knutsen, S.M., Larsen, K.I., *Marine and petroleum geology,* Feb. 1997, 14(1), p.27-54, Refs. p.52-54.

Marine geology, Subpolar regions, Geological surveys, Pleistocene, Geologic structures, Tectonics, Stratigraphy, Subsidence, Seismic reflection, Profiles, Barents Sea

51-3514

Nonequilibrium kinetics of rarefied gas in the porous layer of a cometary nucleus.

Skorov, IU.V., *Solar system research,* Jan.-Feb. 1997, 31(1), p.24-37, Translated from Astronomicheskiĭ vestnik. 22 refs.

Extraterrestrial ice, Ice physics, Ice sublimation, Vapor diffusion, Porosity, Ice vapor interface, Mass transfer, Molecular energy levels, Mathematical models

51-3515

NIST provides first definitive evidence for transcontinental transport of carbonaceous aerosol ("soot") from North American forest fires to Summit, Greenland. *U.S. National Institute of Standards and Technology. Journal of research,* Nov.-Dec. 1996, 101(6), p.838-839.

Forest fires, Aerosols, Biomass, Fallout, Environmental tests, Ice sheets, Atmospheric circulation, Atmospheric composition, Air pollution, Origin, Sampling, Microanalysis, Carbon isotopes, Greenland—Summit

51-3516

Measured and modelled scattering properties of simulated particles of granular and spongy hail at microwave and millimeter-wave frequencies.

Auchterlonie, L.J., Fletcher, P.N., Hume, A.L., *IEEE proceedings. Microwaves, antennas and propagation,* Feb. 1997, 144(1), p.27-34, 22 refs.

Precipitation (meteorology), Remote sensing, Hail, Spongy ice, Snow pellets, Ice melting, Microwaves, Scattering, Attenuation, Ice optics, Refractivity, Ice dielectrics, Models

51-3517

Unsaturated flow in a layered, glacial-contact delta deposit measured by the use of ^{18}O, Cl^- and Br^- as tracers.

Swensen, B., *Soil science,* Apr. 1997, 162(4), p.242-253, 35 refs.

Hydrogeology, Ground water, Soil pollution, Soil tests, Glacial deposits, Seepage, Adsorption, Water transport, Oxygen isotopes, Snowmelt, Meltwater, Isotope analysis, Environmental tests

51-3518

Polarized luminescence of J-aggregates in frozen solutions.

Varnavskiĭ, O.P., Vitukhnovskiĭ, A.G., Drobizhev, M.A., Shcheblikin, I.G., Ushomirskiĭ, M.N., *Lebedev Physics Institute. Bulletin,* 1995, No.12, p.8-14, Translated from Kratkie soobshcheniia po fizike. 13 refs.

Luminescence, Frozen liquids, Solutions, Anisotropy, Molecular energy levels, Low temperature research, Radiation absorption, Polarization (waves), Spectra, Optical properties, Ice spectroscopy

51-3519

Arctic Council: can cooperation be sustained?

Nuttall, M., *Polar record,* Apr. 1997, Vol.33, p.99-100.

Environmental protection, Economic development, Ecosystems, International cooperation, Organizations, Legislation

51-3520

Arctic summer sea-ice SAR signatures, melt-season characteristics, and melt-pond fractions.

Jeffries, M.O., Schwartz, K., Li, S., *Polar record,* Apr. 1997, Vol.33, p.101-112, 35 refs.

Oceanography, Sea ice, Ice surveys, Radiometry, Spaceborne photography, Synthetic aperture radar, Backscattering, Ice surface, Ponds, Ice melting, Ice water interface, Seasonal variations, Models, Snow cover effect, Arctic Ocean

51-3521

WWF initiative to develop guidelines and codes of conduct for arctic tourism.

Johnston, M.E., Mason, P., *Polar record,* Apr. 1997, Vol.33, p.151-153, 6 refs.

Organizations, Exploration, Human factors, Economic development, Standards, International cooperation, Environmental protection, Legislation

51-3522

Development of glacial-valley cross sections under conditions of spatially variable resistance to erosion.

Harbor, J.M., *Geomorphology,* Nov. 1995, 14(2), p.99-107, 27 refs.

Glacial geology, Alpine glaciation, Geomorphology, Glacial erosion, Glacier flow, Valleys, Profiles, Slope processes, Rock properties, Bedrock, Landscape development, Simulation, Mathematical models

51-3523

Insights into alpine moraine development from cosmogenic ^{36}Cl buildup dating.

Zreda, M.G., Phillips, F.M., *Geomorphology,* Nov. 1995, 14(2), p.149-156, 28 refs.

Alpine landscapes, Alpine glaciation, Geomorphology, Pleistocene, Moraines, Glacial geology, Landforms, Sedimentation, Stratigraphy, Isotope analysis, Gamma irradiation, Geochronology, Radioactive age determination, Correlation

51-3524

Numerical modeling of advective transport of saturated deforming sediment beneath the Lake Michigan Lobe, Laurentide ice sheet.

Jenson, J.W., Clark, P.U., MacAyeal, D.R., Ho, C., Vela, J.C., *Geomorphology,* Nov. 1995, 14(2), p.157-166, 44 refs.

Pleistocene, Ice sheets, Ice mechanics, Glacial geology, Sediment transport, Advection, Glacier flow, Rheology, Ice solid interface, Deformation, Shear stress, Mathematical models

51-3525

Lobal interactions, rheologic superposition, and implications for a Pleistocene ice stream on the continental shelf of British Columbia.

Hicock, S.R., Fuller, E.A., *Geomorphology,* Nov. 1995, 14(2), p.167-184, Refs. p.182-184.

Pleistocene, Ice sheets, Quaternary deposits, Glacial geology, Ice edge, Glacial deposits, Glacier beds, Sedimentation, Stratigraphy, Lithology, Canada—British Columbia

51-3526

Landforms and structures of the waterlain west end of St. Thomas moraine, SW Ontario, Canada.

Dreimanis, A., *Geomorphology,* Nov. 1995, 14(2), p.185-196, 13 refs.

Pleistocene, Geomorphology, Landforms, Glacial geology, Geological surveys, Moraines, Lithology, Profiles, Sedimentation, Canada—Ontario

51-3527

Sublimation and aeolian sand movement from a frozen surface: experimental results from Presqu'ile Beach, Ontario.

van Dijk, D., Law, J., *Geomorphology,* Feb. 1995, 11(3), p.177-187, 30 refs.

Geomorphology, Landforms, Beaches, Sands, Eolian soils, Sediment transport, Frozen liquids, Simulation, Ice sublimation, Frozen ground, Wind factors, Abrasion, Statistical analysis

51-3528

Numerical simulation of the flow about a swept wing with leading-edge ice accretions.

Kwon, O.J., Sankar, L.N., *International journal of computers & fluids,* Feb. 1997, 26(2), p.183-192, 17 refs.

Aircraft icing, Glaze, Mathematical models, Computerized simulation, Ice accretion, Air flow, Ice air interface, Ice loads, Forecasting, Atmospheric pressure, Ice cover effect, Fluid dynamics

51-3529

Changing environmental effects on frost hardiness of Scots Pine during dehardening.

Leinonen, I., Repo, T., Hänninen, H., *Annals of botany,* Feb. 1997, 79(2), p.133-138, 29 refs.

Plants (botany), Trees (plants), Plant tissues, Frost resistance, Global warming, Temperature effects, Light effects, Climatic factors, Simulation, Environmental tests

51-3530

On a possible model to explain phytoplankton blooms produced by a receding ice edge.

Donato, A., Valenti, G., *International journal of nonlinear mechanics,* May 1997, 32(3), p.465-470, 6 refs.

Marine biology, Plankton, Biomass, Sea ice, Ice melting, Ice edge, Ocean currents, Wave propagation, Thermodynamics, Ice water interface, Mathematical models, Turbulent diffusion

This paper presents a mathematical model to describe the interaction of ice-ocean-plankton in the southern ocean, based on a similar model used for blooms in the estuaries. The model obtained is hyperbolic and wave phenomena may be studied. Travelling wave solutions are related to the formations of blooms. (Auth.)

51-3531

Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers.

Kraus, J.F., Benson, C.H., Erickson, A.E., Chamberlain, E.J., MP 4022, *Journal of geotechnical and geoenvironmental engineering,* Mar. 1997, 123(3), p.229-238, 24 refs.

Linings, Soil tests, Clay minerals, Geotextiles, Freeze thaw cycles, Freeze thaw tests, Permeability, Water flow, Ice formation, Soil water migration, Cold weather tests, Frost resistance

Hydraulic conductivity tests were conducted in the laboratory and field on geosynthetic clay liners (GCLs) and a sand-bentonite mixture to determine if their hydraulic conductivity is affected by freezing and thawing. In the laboratory, specimens of three GCLs were frozen and thawed 20 times, and no increase in hydraulic conductivity was measured. The hydraulic conductivity of the compacted sand-bentonite also did not increase after freezing and thawing. In the field, two types of GCLs and a sand-bentonite test pad (constructed with the same mixture used in the laboratory) were exposed to one or two winters of freeze-thaw cycling. No large increase in hydraulic conductivity was measured for the field test conducted with the sand-bentonite mixture. An increase in hydraulic conductivity was observed in only one of the field tests with GCLs. Examination of thawed GCLs and specimens of the sand-bentonite mixture showed no evidence of cracking that is commonly found in thawed compacted clays.

51-3532

Isotope data from Ice Station Weddell: implications for deep water formation in the Weddell Sea.

Weppernig, R., Schlosser, P., Khatiwala, S., Fairbanks, R.G., *Journal of geophysical research,* Nov. 15, 1996, 101(C10), p.25,723-25,739, 45 refs.

Oceanography, Ocean currents, Boundary layer, Turbulent diffusion, Oxygen isotopes, Isotope analysis, Topographic effects, Glacier melting, Meltwater, Hydrography, Antarctica—Weddell Sea

This contribution presents a tracer data set (helium and oxygen isotopes) collected during the drift of Ice Station Weddell and discusses it in terms of its relevance for deep and bottom water formation in the southern and western Weddell Sea. The authors use ^{3}He and δ^{18}O data for determination of the transfer of Weddell Deep Water or Warm Deep Water into the winter mixed layer. The ^{4}He concentration and the $H_2{}^{18}O/H_2{}^{16}O$ ratio provide information on the relative contributions of the individual shelf water masses to Weddell Sea Deep Water and Weddell Sea Bottom Water. (Auth. mod.)

51-3533

Seasonal and interannual variations of the oceanic heat flux under a landfast antarctic sea ice cover.

Heil, P., Allison, I., Lytle, V.I., *Journal of geophysical research,* Nov. 15, 1996, 101(C10), p.25,741-25,752, 36 refs.

Climatology, Fast ice, Air ice water interaction, Ice growth, Air temperature, Water temperature, Ice heat flux, Seasonal variations, Snow cover effect, Ice cover effect, Thermodynamics, Models, Meteorological factors

A multilayer thermodynamic model is used to simulate sea ice growth for 12 years between 1958 and 1986 in the vicinity of the Australian station Mawson on the coast of East Antarctica. The atmospheric forcing data for the model are derived from radiosonde profiles and from surface measurements. Global radiation data are available for 4 years, and these measurements are used for comparison with the results of a Zillman-type model for global radiation. Combining the thermodynamic model with sea ice thickness measurements for 12 years, the energy balance equation for the oceanic heat flux is solved. The oceanic heat flux is not constant but changes with time within the year and from year to year. In general, the oceanic heat flux increases from the start of the fast ice formation season in early Apr. until it breaks out in Dec. or Jan. To compare the calculated oceanic heat fluxes for different years, the total ice season is divided into three characteristic time regimes of the sea ice growth and the averaged oceanic heat fluxes calculated for each regime. For the first regime (through Aug.) the mean flux is 2.7 W/m^2, for the middle regime (Sep.) it is 8.4 W/m^2, and for the final regime (Oct-Jan.) it is 17 W/m^2. Comparison of passive microwave data of sea ice extent and concentration with the model results reveals a correlation between the magnitude of the oceanic heat flux and local features such as polynyas. (Auth. mod.)

51-3534

Thin ice thickness from satellite thermal imagery.

Yu, Y., Rothrock, D.A., *Journal of geophysical research,* Nov. 15, 1996, 101(C10), p.25,753-25,766, 40 refs.

Oceanography, Sea ice, Young ice, Ice cover thickness, Ice growth, Ice water interface, Spaceborne photography, Radiometry, Surface temperature, Thermodynamics, Seasonal variations, Ice forecasting, Mathematical models

51-3535

Variability and climate sensitivity of landfast arctic sea ice.

Flato, G.M., Brown, R.D., *Journal of geophysical research,* Nov. 15, 1996, 101(C10), p.25,767-25,777, 36 refs.

Oceanography, Climatic changes, Ice cover effect, Sea ice, Fast ice, Ice cover thickness, Snow accumulation, Albedo, Seasonal freeze thaw, Ice forecasting, Ice models, Thermodynamics, Mathematical models

51-3536

Deposition of ^{210}Pb to the Agassiz Ice Cap, Canada.

Peters, A.J., Gregor, D.J., Wilkinson, P., Spencer, C., *Journal of geophysical research,* Mar. 20, 1997, 102(D5), p.5971-5978, 21 refs.

Snow surveys, Snow composition, Snow accumulation, Firn, Glacier ice, Aerosols, Radioactive isotopes, Isotope analysis, Radioactive age determination, Fallout, Seasonal variations, Statistical analysis, Canada—Northwest Territories—Agassiz Ice Cap

51-3537

Freezing behavior of single sulfuric acid aerosols suspended in a quadrupole trap.

Carleton, K.L., Sonnenfroh, D.M., Rawlins, W.T., Wyslouzil, B.E., Arnold, S., *Journal of geophysical research,* Mar. 20, 1997, 102(D5), p.6025-6033, 39 refs.

Climatology, Atmospheric composition, Cloud physics, Polar stratospheric clouds, Aerosols, Cloud droplets, Supercooling, Nucleation rate, Heterogeneous nucleation, Freezing points, Phase transformations, Ice optics, Simulation, Temperature effects

51-3538

Millimeter wave spectroscopic measurements over the South Pole 4. O_3 and N_2O during 1995 and their correlations for two quasi-annual cycles.

Cheng, D.J., Crewell, S., Klein, U., De Zafra, R.L., Chamberlin, R.A., *Journal of geophysical research,* Mar. 20, 1997, 102(D5), p.6109-6116, 15 refs.

Climatology, Stratosphere, Degradation, Spectroscopy, Profiles, Aerosols, Ozone, Subsidence, Photochemical reactions, Seasonal variations, Statistical analysis, Antarctica—Amundsen-Scott Station

Presented are new O_3 and N_2O observations at the South Pole in 1995 and correlations between O_3 and N_2O for two 11-month observations during Feb. 1993 and Jan. 1994 and Jan-Dec. 1995. Strong similarities exist between the two quasi-annual cycles for both O_3 and N_2O. During springtime warmings the O_3/N_2O ratio shows a tight coupling between O_3 and N_2O around 20 km, as transport creates the low-altitude O_3 peak. A rapid and systematic decrease of the O_3/N_2O ratio during summer in the 25 to 30 km region supports the increasingly dominant role of photochemistry in producing the vertical profile for O_3 above ca. 25 km. The present analysis should help to clarify the influence of the relatively unique O_3 vertical distribution of polar ozone when interpreting O_3-N_2O correlations. (Auth. mod.)

51-3539

Comparison between vertical ozone soundings and reconstructed potential vorticity maps by contour advection with surgery.

Mariotti, A., Moustaoui, M., Legras, B., Teitelbaum, H., *Journal of geophysical research,* Mar. 20, 1997, 102(D5), p.6131-6142, 27 refs.

Climatology, Polar atmospheres, Atmospheric circulation, Advection, Stratosphere, Ozone, Aerosols, Seasonal variations, Sounding, Profiles, Temperature effects, Correlation

51-3540

Long-lived tracer transport in the antarctic stratosphere.

Strahan, S.E., Nielsen, J.E., Cerniglia, M.C., *Journal of geophysical research,* Nov. 27, 1996, 101(D21), p.26,615-26,629, 18 refs.

Climatology, Polar atmospheres, Stratosphere, Aerosols, Air flow, Turbulent diffusion, Seasonal variations, Spectroscopy, Simulation

Recent observations made by the Cryogenic Limb Array Etalon Spectrometer (CLAES) on the Upper Atmosphere Research Satellite (UARS) indicate that during the austral fall, CH_4 zonal mean isopleths in the antarctic vortex appear to descend more rapidly than those of N_2O. How is this possible in an isolated region such as the vortex when photochemical sinks are insignificant? To understand these observations, the authors have run a simulation of the 1992 austral fall using the Goddard Global Spectral Mechanistic Model (GSMM) and the three-dimensional Chemistry and Transport Model (CTM). Model tracer fields show good agreement with the observations over a 4-month period beginning in mid-Feb. This analysis demonstrates the relationship between wave activity, eddy transport, and tracer mixing ratios inside the vortex throughout the fall. In addition, CLAES observations deep in the vortex (70-80°S) show gradually increasing CH_4 mixing ratios from Mar. to Sep., implying the importance of eddy-driven mixing within the vortex in winter. (Auth. mod.)

51-3541

Dimethyl sulfide, methane sulfonic acid and physicochemical aerosol properties in Atlantic air from the United Kingdom to Halley Bay.

Davison, B., et al, *Journal of geophysical research,* Oct. 20, 1996, 101(D17), p.22,855-22,867, 58 refs.

Climatology, Atmospheric composition, Marine atmospheres, Atmospheric composition, Ion density (concentration), Aerosols, Air water interactions, Vapor transfer, Cloud physics, Condensation nuclei, Coagulation, Antarctica—Weddell Sea, Antarctica—Antarctic Peninsula

The concentrations of dimethyl sulfide in air were obtained during a cruise between the United Kingdom and the Antarctic in the period Oct. 1992 to Jan. 1993 using a method of sampling and analysis optimized to avoid interferences from oxidants. In the polar waters and regions south of the Falkland Is., concentrations from 3 to 714 ng $(S)/m^3$ were observed. Accumulation mode particle concentrations averaged $25/cm^3$ in the clean marine and polar air masses south of 58°S while background condensation nuclei (CN) concentrations were of the order of $400\text{-}600/cm^3$. It is not clear whether boundary layer nucleation of new CN or entrainment from the free troposphere provided the source of CN. Periods of elevated CN concentrations were regularly observed in the boundary layer over the Weddell Sea and were attributed to "bursts" of new particle formation. However, shortly after these nucleation events the CN concentration rapidly decayed to the background level through coagulation losses, suggesting little impact on the background CN or cloud condensation nuclei (CCN) concentration. (Auth. mod.)

51-3542

Polar ozone depletion: a three-dimensional chemical modeling study of its long-term global impact.

Eckman, R.S., Grose, W.L., Turner, R.E., Blackshear, W.T., *Journal of geophysical research,* Oct. 20, 1996, 101(D17), p.22,977-22,989, 41 refs.

Climatology, Climatic changes, Aerosols, Ozone, Turbulent diffusion, Polar stratospheric clouds, Degradation, Migration, Global change, Environmental impact, Simulation

The export of ozone-poor air from the antarctic polar region following the breakup of the Southern Hemisphere polar vortex is examined with a three-dimensional chemistry transport model. Two 5-year simulations were performed utilizing the NASA Langley Research Center three-dimensional chemistry transport model. One simulation included only gas phase and sulfate aerosol chemistry, while the second simulation also included reactions occurring on polar stratospheric clouds (PSCs). The model-calculated seasonal variation of Southern Hemisphere O_3, HNO_3, and active chlorine as a result of PSC chemistry is in reasonable accord with satellite observations. The model reveals that ozone is transported equatorward following the breakup of the polar vortex to approximately 20°S latitude by the first southern summer following the activation of PSC chemistry. These model results, in general agreement with earlier model studies using parameterized chemistry, show that a potential exists for a long-term accumulation of ozone loss in the southern polar region and a gradual increase in the global impact of polar ozone depletion. Comparison with satellite and ground-based observations of ozone trends at mid-latitudes suggests that ozone dilution may be a contributing factor. Experiments were performed to examine the sensitivity of the rate of local ozone recovery following the breakup of the vortex to the depth and spatial extent of the denitrification of polar air. (Auth. mod.)

51-3543

Role of aerosol variations in anthropogenic ozone depletion in the polar regions.

Portmann, R.W., Solomon, S., Garcia, R.R., Thomason, L.W., Poole, L.R., McCormick, M.P., *Journal of geophysical research,* Oct. 20, 1996, 101(D17), p.22,991-23,006, 61 refs.

Climatology, Polar stratospheric clouds, Cloud physics, Degradation, Ozone, Aerosols, Heterogeneous nucleation, Ice formation, Volcanic ash, Simulation

A climatology of aerosol surface area inferred from satellite measurements is used as input in a two-dimensional model to study the long-term evolution of polar ozone depletion, especially the antarctic ozone hole. It is found that volcanic aerosol inputs very likely modulate the severity of the ozone hole. In particular, the rapid deepening of the ozone hole in the early 1980s, as seen, for example, in the Halley Bay total ozone measurements, was probably caused by accelerated heterogeneous chemistry associated with an increase in aerosol surface area due to volcanic injection combined with the anthropogenic perturbation of stratospheric chlorine. This is further substantiated by the large antarctic ozone decline observed and modeled after the eruption of Mount Pinatubo. A number of factors that influence the ozone hole are also investigated, including the effect of liquid versus frozen aerosol, the effects of denitrification and dehydration, the role of HO_x in HCl and $ClONO_2$ recovery, and the effect of chlorine partitioning at the start of winter. These findings suggest that future arctic ozone depletion could be severe in unusually cold winters or years with large volcanic aerosol surface area. (Auth. mod.)

51-3544

Comment on "Solute effects on the evaporation of ice particles" by Jen-Ping Chen and Paul J. Crutzen.

Baker, M., Nelson, J., Chen, J.P., Crutzen, P.J., *Journal of geophysical research,* Oct. 20, 1996, 101(D17), p.23,035-23,038, Includes reply. 16 refs. For pertinent paper see 49-692.

Cloud physics, Ice physics, Ice surface, Ice sublimation, Solubility, Ice vapor interface, Impurities, Thermodynamic properties, Vapor pressure

51-3545

Modeling and observational study of the detailed microphysical structure of tropical cirrus anvils.

Chen, J.P., McFarquhar, G.M., Heymsfield, A.J., Ramanathan, V., *Journal of geophysical research,* Mar. 27, 1997, 102(D6), p.6637-6653, 47 refs.

Climatology, Cloud physics, Convection, Profiles, Particle size distribution, Microstructure, Ice crystals, Ice formation, Condensation nuclei, Sedimentation, Heterogeneous nucleation, Simulation, Temperature effects

51-3546

Height- and time-dependent model of polar mesosphere summer echoes.

Klostermeyer, J., *Journal of geophysical research,* Mar. 27, 1997, 102(D6), p.6715-6727, 46 refs.

Polar atmospheres, Atmospheric electricity, Radar echoes, Wave propagation, Ice physics, Ice crystals, Ice electrical properties, Scavenging, Heterogeneous nucleation, Turbulent diffusion, Scattering, Theories, Mathematical models

51-3547

Modeling air movement and bubble trapping in firn.

Trudinger, C.M., et al, *Journal of geophysical research,* Mar. 27, 1997, 102(D6), p.6747-6763, 38 refs.

Snow physics, Climatology, Snow composition, Ice cores, Firn, Bubbles, Chemical analysis, Air flow, Vapor diffusion, Atmospheric composition, Ice dating, Correlation, Snow air interface

A finite difference model for gas diffusion and bubble trapping in firn is described. The model uses prescribed profiles of density, open and closed porosity, and diffusivity to determine the diffusion and trapping processes. The model is calibrated and tested by using measured air composition in the firn at the DE08-2 site on Law Dome. In particular, the authors focus on carbon dioxide (CO_2), methane (CH_4), and sulfur hexafluoride (SF_6), which have well-determined atmospheric records. These trace gases are used to tune the diffusivity-porosity relationship, which is the most uncertain of the model inputs. The model quantifies the smoothing effect of the firn diffusion and bubble trapping on atmospheric signals. The fully corrected $\delta^{13}CO_2$ record from the DE08-2 firn is compared with the history of Cape Grim direct atmospheric measurements with excellent agreement. (Auth. mod.)

51-3548

Lagrangian study of the antarctic polar vortex.

Paparella, F., Babiano, A., Basdevant, C., Provenzale, A., Tanga, P., *Journal of geophysical research,* Mar. 27, 1997, 102(D6), p.6765-6773, 20 refs.

Climatology, Polar atmospheres, Stratosphere, Radio echo soundings, Atmospheric circulation, Atmospheric pressure, Turbulent boundary layer, Turbulent exchange, Advection, Permeability, Wind direction

The authors study the dynamics of passively advected tracers in the antarctic polar vortex, using the wind fields provided by the European Centre for Medium-Range Weather Forecasts' (ECMWF) analysis from Aug. to Oct. 1993. Advection on both isopycnal and isentropic surfaces is considered. A new definition of the vortex edge, identified as the maximum of kinetic energy, is compared with the definition based on the maximum gradient of Ertel potential vorticity. Using the kinetic energy criterion, they study the permeability of the polar vortex in the framework of the launch strategy of the Stratospheric Eole (Strateole) polar ozone experiment. A quantitative estimate of the probability that a passive tracer may cross the vortex edge, confirming the strong impermeability of the polar vortex to inward and outward particle motions is included. (Auth. mod.)

51-3549

Evaluation of the GFDL GCM climate variability 2. Stochastic modeling and latitude-temporal fields.

Polyak, I., North, G., *Journal of geophysical research,* Mar. 27, 1997, 102(D6), p.6799-6812, 10 refs.

Climatology, Air temperature, Surface temperature, Polar atmospheres, Temperature variations, Statistical analysis, Simulation, Spectra, Correlation

51-3550

Wonderland climate model.

Hansen, J., et al, *Journal of geophysical research,* Mar. 27, 1997, 102(D6), p.6823-6830, 13 refs.

Climatology, Simulation, Surface temperature, Sea ice distribution, Ice heat flux, Models, Theories, Meteorological factors

The authors obtain a highly efficient global climate model by defining a sector version (including both polar regions) of the coarse resolution Goddard Institute for Space Studies model II. The geography

of Wonderland is chosen such that the amount of land as a function of latitude is the same as on Earth. They show that the zonal mean climate of the Wonderland model is very similar to that of the parent model II. (Auth. mod.)

51-3551
Infrared radiative transfer in the 9.6-μm band: application to TIROS operational vertical sounder ozone retrieval.
Engelen, R.J., Stephens, G.L., *Journal of geophysical research*, Mar. 27, 1997, 102(D6), p.6929-6939, 28 refs.
Climatology, Atmospheric composition, Polar atmospheres, Ozone, Detection, Radiation balance, Sounding, Spectroscopy, Models
This paper introduces a radiative transfer model for the 9.6-μm ozone band that specifically matches the TIROS operational vertical sounder (TOVS) channel 9. The model is based on a spectral Malkmus band model for transmission. While this new model is exploited in the development of the retrieval described in this paper, the result has wider applicability to ozone climate problems, in both the Arctic and Antarctic, requiring calculation of the radiative forcing associated with changing ozone. Because the TOVS ozone channel is mainly sensitive to lower stratospheric ozone, ozone columns of the upper layer (above 30 hPa and with mean pressure of 10 hPa) are prescribed as a function of latitude. Ozone columns of the lower layer (mean pressure of 105 hPa) are then retrieved. Global distribution of the retrieval error and also of the contribution of a priori knowledge to the retrieval is presented to provide a validity of the ozone retrievals. Total ozone mapping spectrometer (TOMS) statistics are used as a priori information in the retrieval, and the 40-layer model is used to estimate the forward model error of the two-layer model. (Auth. mod.)

51-3552
Radiative characteristics of the arctic atmosphere during spring as inferred from ground-based measurements.
Pinto, J.O., Curry, J.A., Fairall, C.W., *Journal of geophysical research*, Mar. 27, 1997, 102(D6), p.6941-6952, 39 refs.
Climatology, Polar atmospheres, Cloud cover, Radiation balance, Radiation measurement, Optical properties, Ice crystal optics, Atmospheric boundary layer, Surface energy, Sounding, Transmissivity, Seasonal variations

51-3553
Effects of clouds, ice sheet, and sea ice on the Earth radiation budget in the Antarctic.
Yamanouchi, T., Charlock, T.P., *Journal of geophysical research*, Mar. 27, 1997, 102(D6), p.6953-6970, 52 refs.
Climatology, Polar atmospheres, Radiation balance, Cloud cover, Sea ice, Ice sheets, Ice cover effect, Albedo, Radiation absorption, Climatic factors, Radiometry
The effects of clouds, the continental ice sheet, and sea ice on the radiation budget in the Antarctic are examined by using Earth Radiation Budget Experiment, International Satellite Cloud Climatology Project, and special sensor microwave/imager data in 1987-88. The continental ice sheet affects not only the albedo but also the surface temperature because of elevation and hence the outgoing longwave radiation (OLR). The high elevation of the antarctic continent makes the radiation budget in both polar regions asymmetric. Cloud forcing increases the albedo by 0.3 and reduces the OLR by 30-40 W/M^2. However, these numbers do not fully differentiate the independent effects of sea ice and cloudiness. A more detailed analysis shows that the independent effect of sea ice is as large as clouds, with clouds masking the radiative effect of sea ice by more than one half. (Auth. mod.)

51-3554
Distribution of Fe in the Antarctic Circumpolar Current.
Löscher, B.M., De Baar, H.J.W., De Jong, J.T.M., Veth, C., Dehairs, F., *Deep-sea research II*, Jan.-Feb. 1997, 44(1-2), p.143-187, Refs. p.182-187.
Oceanographic surveys, Ocean currents, Hydrography, Marine biology, Ice composition, Sea ice, Snow composition, Chemical analysis, Ice water interface
The large-scale distributions of dissolved and total Fe in surface and deep waters of the Antarctic Circumpolar Current exhibit strong relationships with hydrography and biological processes. The mean dissolved Fe concentrations are low in surface waters of the Antarctic Circumpolar Current (0.31-0.49 nM, with a minimum of 0.17 nM) and higher (averaging 1.1-1.9 nM) in the Polar Frontal region. Enhanced dissolved surface water concentrations in the Polar Frontal region are attributed to input from the continental shelf and coincide with phytoplankton spring blooms of large diatoms. The effects of sea-ice melting and iceberg melting on the Fe concentrations in the Antarctic Bottom Water are higher than those of other water masses in the Antarctic Circumpolar Current, consistent with the nepheloid layer as well as diagenetic input from shelf sediments. (Auth. mod.)

51-3555
Carbon fluxes to Antarctic top predators.
Van Franeker, J.A., Bathmann, U.V., Mathot, S., *Deep-sea research II*, Jan.-Feb. 1997, 44(1-2), p.435-455, Refs. p.453-455.
Marine biology, Ecology, Algae, Biomass, Plankton, Sea ice distribution, Ice cover effect, Antarctica—Weddell Sea
The role of birds, seals and whales in the overall biological carbon fluxes of the southern ocean has been estimated based on census counts of top predator individuals in the region. Using standard routines for conversion to food consumption and respiration rates the authors demonstrate that at most 0.3-0.6% of primary production in the southern ocean is exhaled, even if primary production by ice-algae is ignored. Food requirements of top predators indicate that photosynthetic production in the ice biota likely is substantial, deserving future attention and research. The results of these field observations deviate strongly from much higher top-predator respiration of 2-22.5% of primary production, as recently suggested from theoretical models. The findings illustrate that the antarctic food web is more complex than hitherto acknowledged. (Auth.)

51-3556
Internal character and formation of the Battery Point Drumlin, Lunenburg County, Nova Scotia.
Jones, N.K., *Canadian geographer*, 1996, 40(3), p.273-280, 22 refs.
Pleistocene, Quaternary deposits, Glacial geology, Glacial erosion, Glacial deposits, Landforms, Structural analysis, Lithology, Geomorphology, Canada—Nova Scotia

51-3557
Can high arctic soil microarthropods survive elevated summer temperatures?
Hodkinson, I.D., Coulson, S.J., Webb, N.R., Block, W., *Functional ecology*, June 1996, 10(3), p.314-321, 25 refs.
Soil microbiology, Tundra soils, Tundra climate, Soil temperature, Moisture transfer, Global warming, Ecosystems, Environmental tests, Survival, Microclimatology, Temperature effects

51-3558
Catastrophic floods during deglaciation in a small, mountain catchment, British Columbia.
Goff, J.R., Hicock, S.R., *Geographical review of Japan B*, 68(2), Dec. 31, 1996, p.95-106, 26 refs.
Pleistocene, Quaternary deposits, Glacial geology, Ice deterioration, Glacial deposits, Glacial lakes, Lake bursts, Ice dams, Geochronology, Lithology, Stratigraphy, Canada—British Columbia

51-3559
Pleistocene ice at the bottom of the Vavilov ice cap, Severnaya Zemlya, Russian Arctic.
Stiévenard, M., et al, *Journal of glaciology*, 1996, Vol.42, p.403-406, 20 refs.
Glaciology, Pleistocene, Ice sheets, Bottom ice, Boreholes, Ice dating, Ice cores, Quaternary deposits, Sedimentation, Isotope analysis, Profiles, Russia—Severnaya Zemlya

51-3560
Prediction of possible changes in glacio-hydrological characteristics under global warming: southeastern Alaska, U.S.A.
Davidovich, N.V., Ananicheva, M.D., *Journal of glaciology*, 1996, Vol.42, p.407-412, 9 refs.
Climatology, Glaciology, Mountain glaciers, Glacial hydrology, Glacier melting, Glacier mass balance, Global warming, Snow air interface, Snow line, Long range forecasting, United States—Alaska

51-3561
Force-balance study of ice flow and basal conditions of Jutulstraumen, Antarctica.
Høydal, O.A., *Journal of glaciology*, 1996, Vol.42, p.413-425, 18 refs.
Glaciology, Glacier flow, Glacier mass balance, Glacial geology, Bedrock, Profiles, Ice solid interface, Basal sliding, Ice mechanics, Shear stress, Ice temperature, Topographic effects, Antarctica—Jutulstraumen Glacier
Stresses and velocities at depth are calculated across Jutulstraumen, an ice stream in Queen Maud Land, draining about 1% of the antarctic ice sheet. The force-balance study is based on data from kinematic GPS measurements on three strain nets, each consisting of 3 x 3 stakes. The maximum measured velocity is 443 m/a and the velocity variation over short distances is large compared with studied ice streams in West Antarctica. The surface topography together with the measured velocities across the profile indicate that the bottom topography has a great influence on the flow direction, even where the ice thickness is more than 2000 m. The heat produced by sliding and internal deformation is sufficient to keep the base at the pressure-melting point. The annual basal melting is estimated to be about 60 mm. The mass flow calculated by the force-balance method is between 87 and 96% of pure plug flow. (Auth. mod.)

51-3562
Localized surface-ice weakness on a glacial ice runway.
Lang, R.M., Blaisdell, G.L., MP 4023, *Journal of glaciology*, 1996, Vol.42, p.426-439, 16 refs.
Glaciology, Ice (construction material), Ice runways, Mechanical tests, Ice strength, Ice deterioration, Ponds, Meltwater, Thin sections, Ice solid interface, Stress strain diagrams, Brittleness, Compressive properties
Following construction of a glacial ice runway on the Ross Ice Shelf, and prior to flight operations, the runway was proof-rolled. The proof exercise was designed to simulate typical heavy aircraft. Initial testing produced numerous brittle surface failures in the runway ice. Thin sections of ice cores taken from the failed areas showed large crystals of clear, blue ice with long, vertical bubbles, indicative of ice formed directly from meltwater. Uniaxial unconfined compression tests on core samples were used to compare runway ice strength with published data for polycrystalline laboratory ice. Since the frequent failure of surface ice had not been expected, it was critical to understand the formation and mechanical properties of the weak ice to prevent its occurrence in the future and to strengthen the existing problem areas. Likely scenarios for development of weak ice on the airstrip and the physical properties of this type of ice are discussed. (Auth. mod.)

51-3563
Evidence from $^{40}Ar/^{39}Ar$ ages for a Churchill province source of ice-rafted amphiboles in Heinrich layer 2.
Gwiazda, R.H., Hemming, S.R., Broecker, W.S., Onsttot, T., Mueller, C., *Journal of glaciology*, 1996, Vol.42, p.440-446, 34 refs.
Glaciology, Ice sheets, Icebergs, Marine geology, Ice rafting, Calving, Quaternary deposits, Glacial deposits, Bottom sediment, Drill core analysis, Isotope analysis, Radioactive age determination

51-3564
On Mertz and Ninnis Glaciers, East Antarctica.
Wendler, G., Ahlnas, K., Lingle, C.S., *Journal of glaciology*, 1996, Vol.42, p.447-453, 15 refs.
Glaciology, Glacier surveys, Glacier flow, Glacier tongues, Spaceborne photography, Synthetic aperture radar, Floating ice, Glacier oscillation, Periodic variations, Antarctica—Ninnis Glacier Tongue, Antarctica—Mertz Glacier
Two large glacier tongues, which extend substantially across the coastline of King George V Land in East Antarctica, have been studied by remote sensing (synthetic aperture radar, JERS-1). The tongue of Mertz Glacier is in a state of advance, while the Ninnis Glacier tongue is retreating. The distinctive surface structure and the form of the glacier tongues indicates that they are floating. While the tongue of Ninnis Glacier has lost about two-thirds of its area since 1913, the Mertz Glacier tongue has advanced substantially and has about doubled its areal extent over the same time period. The annual movement of the tongue of Mertz Glacier was determined as about 1.2 km. This is close to the value of the advance of the tip of the tongue since 1963, which was determined as 0.9 km/year. (Auth. mod.)

51-3565
Superimposed ice in glacier mass balance on the Tibetan Plateau.
Fujita, K., Seko, K., Ageta, Y., Pu, J.C., Yao, T.D., *Journal of glaciology*, 1996, Vol.42, p.454-460, 16 refs.
Glaciology, Mountain glaciers, Glacier mass balance, Glacial hydrology, Glacier melting, Seepage, Snow ice interface, Regelation, Ice cores, Hydrologic cycle, Seasonal variations, China—Tibet

51-3566
Surface velocity and mass balance of Ice Streams D and E, West Antarctica.
Bindschadler, R., Vornberger, P., Blankenship, D., Scambos, T., Jacobel, R., *Journal of glaciology*, 1996, Vol.42, p.461-475, 24 refs.
Glaciology, Glacier surveys, Glacier flow, Glacier mass balance, Glacier thickness, LANDSAT, Spaceborne photography, Velocity measurement, Strains, Image processing, Antarctica—Ross Ice Shelf
Over 75,000 surface-velocity measurements are extracted from sequential satellite imagery of Ice Streams D and E to reveal a complex pattern of flow not apparent from previous measurements. Horizontal and vertical strain rates, calculated from surface velocity, indicate that the bed experiences larger basal shear where the surface

of these ice streams is rougher. Ten airborne-radar profiles and one surface-based radar profile of ice thickness make possible the calculation of mass balance for longitudinal sections of each ice stream. Systematic errors continue to limit the ability of the flux-differencing technique used here to resolve local variations in mass balance. Nevertheless, significant local variations in mass balance are revealed, while, overall, Ice Streams D and E are in approximate equilibrium. An earlier estimate of the net mass balance for Ice Stream D is improved. (Auth. mod.)

51-3567

Tidal motion, ice velocity and melt rate of Petermann Gletscher, Greenland, measured from radar interferometry.

Rignot, E., *Journal of glaciology,* 1996, Vol.42, p.476-485, 33 refs.

Glaciology, Glacier flow, Velocity measurement, Grounded ice, Floating ice, Ice melting, Glacier tongues, Ice shelves, Tidal currents, Ice water interface, Oscillations, Radar echoes, Spaceborne photography, Greenland—Petermann Gletscher

51-3568

Late Pleistocene interactions of East and West Antarctic ice-flow regimes: evidence from the McMurdo Ice Shelf.

Kellogg, T.B., Hughes, T., Kellogg, D.E., *Journal of glaciology,* 1996, Vol.42, p.486-500, 58 refs.

Glacial geology, Pleistocene, Ice sheets, Ice shelves, Glacier flow, Glacier oscillation, Glacier ablation, Grounded ice, Glacial deposits, Quaternary deposits, Models, Antarctica—West Antarctica, Antarctica—McMurdo Ice Shelf, Antarctica—East Antarctica

The authors present new interpretations of deglaciation in McMurdo Sound and the western Ross Sea, with observationally based reconstructions of interactions between East and West Antarctic ice at the last glacial maximum (LGM), 16,000, 12,000, 8,000 and 4,000 BP. At the LGM, East Antarctic ice from Mulock Glacier split; one branch turned westward south of Ross I. but the other branch rounded Ross I. before flowing southwest into McMurdo Sound. After the LGM, grounding-line retreat was most rapid in areas with greatest water depth, especially along the Victoria Land coast. By 12,000 BP, the ice-flow regime in McMurdo Sound changed to through-flowing Mulock Glacier ice. The modern flow regime was established ca. 4,000 BP. Ice derived from high elevations on the Polar Plateau but now stranded on the McMurdo Ice Shelf, and the pattern of the Transantarctic Mountains erratics support reconstructions of Mulock Glacier ice rounding Minna Bluff but with all ice from Skelton Glacier ablating south of the bluff. Ice-sheet modeling holds promise for determining whether deglaciation proceeded by grounding-line retreat of an ice sheet that was largely stagnant, or of a dynamic ice sheet with flowline profiles kept low by active ice streams that extended northward from present-day outlet glaciers after the Ross Ice Shelf grounded. (Auth. mod.)

51-3569

Spatial variations in heat at the base of the antarctic ice sheet from analysis of the thermal regime above subglacial lakes.

Siegert, M.J., Dowdeswell, J.A., *Journal of glaciology,* 1996, Vol.42, p.501-509, 18 refs.

Glaciology, Ice sheets, Ice temperature, Basal sliding, Glacier beds, Ice solid interface, Heat transfer, Thermal regime, Subglacial observations, Lakes, Meltwater, Models

The authors have used a one-dimensional vertical heat-transfer equation to determine theoretical temperature values for the ice-sheet base above 77 subglacial lakes identified from airborne radio-echo-sounding data covering 50% of Antarctica. Variations in temperature to below the pressure-melting temperature over lakes are due to either estimated geothermal heat flux or a neglect of heat derived from (a) internal ice deformation and (b) basal sliding, in the thermal model. Results indicate that, when the geothermal heat flux is set at 54 mW/m^2, the ice-sheet base above 70% of the known antarctic subglacial lakes is calculated to be at the pressure-melting value. For the ice sheet above subglacial lakes located hundreds of kilometers from the ice divide, using the same thermal model, loss of heat due to vertical advection is calculated to be relatively high. As distance from the ice divide increases, so does the amount of heat due to internal ice deformation and basal sliding. (Auth. mod.)

51-3570

Geometry, motion and mass balance of Dyer Plateau, Antarctica.

Raymond, C., Weertman, B., Thompson, L., Mosley-Thompson, E., Peel, D., Mulvaney, R., *Journal of glaciology,* 1996, Vol.42, p.510-518, 11 refs.

Glaciology, Ice sheets, Glacier surveys, Glacier flow, Glacier thickness, Glacier mass balance, Geodetic surveys, Radio echo soundings, Ice cores, Ice density, Firn stratification, Profiles, Antarctica—Dyer Plateau

Geodetic surveying and ground-based radar profiling were used to determine geometry and surface motion of the ice sheet on the Dyer Plateau, in the vicinity of an ice-core site on a local dome. Vertical strain measurements in the core hole constrain the depth profile of vertical velocity. These geophysical measurements are used to analyze the profiles of density and annual layer thickness measured on the ice core to estimate the current mass balance of the ice column and the past history of accumulation rate. Consideration of horizontal and vertical mass-flow divergence shows that the profiles of density and vertical velocity are not fully consistent with steady state. Mean density of the firn layer appears to be increasing, which leads to the deduction of a small rate of mass increase. Over the last 200 a there has been a gradual increase in accumulation rate. (Auth. mod.)

51-3571

On the effect of phase transformations on saline ice compliance.

McKittrick, L.R., Brown, R.L., *Journal of glaciology,* 1996, Vol.42, p.519-532, 32 refs.

Ice mechanics, Salt ice, Brines, Phase transformations, Ice water interface, Ice crystal growth, Mechanical properties, Nucleation, Defects, Stress concentration, Anisotropy, Mathematical models, Ice models

51-3572

Estimation of relative water content in a subpolar glacier using surface-penetration radar.

Hamran, S.E., Aarholt, E., Hagen, K.O., Mo, P., *Journal of glaciology,* 1996, Vol.42, p.533-537, 11 refs.

Glaciology, Glacier surveys, Glacial hydrology, Water content, Radio echo soundings, Backscattering, Mapping

51-3573

Airborne surface profiling of glaciers: a case-study in Alaska.

Echelmeyer, K.A., et al, *Journal of glaciology,* 1996, Vol.42, p.538-547, 27 refs.

Glacier surveys, Mountain glaciers, Aerial surveys, Height finding, Lasers, Profiles, Glacier mass balance, Glacier thickness, Topographic surveys, Correlation, Seasonal variations, Accuracy, United States—Alaska

51-3574

Mass balance of White Glacier, Axel Heiberg Island, N.W.T., Canada, 1960-91.

Cogley, J.G., Adams, W.P., Ecclestone, M.A., Jung-Rothenhäusler, F., Ommanney, C.S.L., *Journal of glaciology,* 1996, Vol.42, p.548-563, 77 refs.

Glaciology, Glacier mass balance, Glacier surveys, Ice surface, Altitude, Stratigraphy, Glacier oscillation, Seasonal variations, Statistical analysis, Accuracy, Canada—Northwest Territories—Axel Heiberg Island

51-3575

Estimation of ice-sheet motion using satellite radar interferometry: method and error analysis with application to Humboldt Glacier, Greenland.

Joughin, I., Kwok, R., Fahnestock, M., *Journal of glaciology,* 1996, Vol.42, p.564-575, 24 refs.

Glaciology, Glacier surveys, Glacier flow, Velocity measurement, Bedrock, Topographic features, Altitude, Synthetic aperture radar, Spaceborne photography, Image processing, Photogrammetric surveys, Statistical analysis, Accuracy, Greenland—Humboldt Glacier

51-3576

New high-precision borehole-temperature logging system used at GISP2, Greenland, and Taylor Dome, Antarctica.

Clow, G.D., Saltus, R.W., Waddington, E.D., *Journal of glaciology,* 1996, Vol.42, p.576-584, 18 refs.

Glaciology, Borehole instruments, Ice sheets, Paleoclimatology, Surface temperature, Ice temperature, Temperature measurement, Portable equipment, Sensors, Electrical logging, Cold weather performance, Accuracy, Wind factors, Greenland, Antarctica—Taylor Dome

The authors describe a high-precision borehole-temperature (BT) logging system developed at the United States Geological Survey (USGS) for use in remote polar regions. Calibration, operational and data-processing procedures, are discussed, and an analysis of the measurement errors presented. The system is modular to facilitate calibration procedures and field repairs. To illustrate this capability, the authors sample data from the 3 km deep borehole at GISP2, Greenland, and from a 130 m deep air filled hole at Taylor Dome. The precision of the incremental Taylor Dome measurements varies from 0.11 to 0.32 mK, depending on the wind strength during the experiments. With this precision, temperature fluctuations and multi-hour trends in the BT measurements correlated well with atmospheric-pressure changes. (Auth. mod.)

51-3577

Simple technique for growing large, optically "perfect" ice crystals.

Knight, C.A., *Journal of glaciology,* 1996, Vol.42, p.585-587, 6 refs.

Laboratory techniques, Ice physics, Ice crystal growth, Ice crystal optics, Ice crystal structure, Orientation, Frost, Buoyancy, Supercooling, Ice water interface

51-3578

Comments on "The use of planimetric surface area in glacier mass-balance calculations: a potential source of errors" by Jacobsen and Theakstone.

Rabus, B., Harrison, W.D., Echelmeyer, K.A., Kaser, G., Jacobsen, F.M., Theakstone, W.H., *Journal of glaciology,* 1996, Vol.42, p.588-589, Includes reply. 11 refs. For pertinent paper see 50-1865.

Glaciology, Glacier mass balance, Glacier surfaces, Measurement, Surface roughness, Topographic effects, Analysis (mathematics), Accuracy, Mapping

51-3579

Effects of recent climate change on permafrost landscapes in central Sakha.

Fedorov, A.N., *Polar geography,* Apr.-June 1996, 20(2), p.99-108, Translated from Geografiia i prirodnye resursy. 17 refs.

Climatic changes, Geocryology, Permafrost transformation, Geomorphology, Active layer, Frozen ground temperature, Global warming, Environmental impact, Russia—Siberia

51-3580

Earthflows on permafrost.

Chaus, I.K., *Polar geography,* Apr.-June 1996, 20(2), p.109-118, Translated from Geomorfologiia. 19 refs.

Permafrost bases, Mass flow, Mudflows, Solifluction, Classifications, Permafrost transformation, Frozen ground mechanics, Soil erosion

51-3581

Thermal and freshwater springs of the Chukchi Peninsula: unique subarctic ecosystems. Part I. Natural conditions.

Vekhov, N.V., *Polar geography,* Apr.-June 1996, 20(2), p.119-128, Translated from Geografiia i prirodnye resursy. 8 refs.

Ecosystems, Hydrogeology, Subarctic landscapes, Springs (water), Hot springs, Tundra soils, Nivation, Distribution, Natural resources, Environmental protection, Russia—Chukchi Peninsula

51-3582

Medical geography of the Arctic and Antarctic.

Deriapa, N.R., *Polar geography,* Apr.-June 1996, 20(2), p.129-136, Translated from Izvestiia Rossiĭskogo geograficheskogo obshchestva. Refs. p.133-136.

Cold weather survival, Bibliographies, Health, Geography

An exploratory paper surveys important issues to be addressed in the study of medical geography of the arctic and antarctic regions. It also provides an extensive review of the Russian-language literature on the subject and sheds light on major directions for future research. (Auth. mod.)

51-3583

Acidification of surface waters in the northern Kola Peninsula.

Moiseenko, T.I., *Polar geography,* Apr.-June 1996, 20(2), p.137-150, Translated from Izvestiia Rossiĭskogo geograficheskogo obshchestva. 29 refs.

Subpolar regions, River basins, Surface waters, Air pollution, Water pollution, Aerosols, Fallout, Environmental impact, Origin, Hydrogeochemistry, Russia—Kola Peninsula

51-3584
Specifics of bog formation in the Yenisey taiga.
Gorozhankina, S.M., *Polar geography,* Apr.-June 1996, 20(2), p.151-160, Translated from Akademii nauk. Izvestiia. Seriia geograficheskaia. 15 refs.
Wetlands, Subarctic landscapes, Landscape development, Taiga, Geocryology, Classifications, Peat, Stratigraphy, Organic soils, Russia—Yenisey River

51-3585
Spectral analysis of climate data.
Yiou, P., Baert, E., Loutre, M.F., *Surveys in geophysics,* Nov. 1996, 17(6), p.619-663, Refs. p.658-663.
Paleoclimatology, Geophysical surveys, Climatic changes, Air temperature, Global change, Temperature variations, Meteorological data, Climatic factors, Spectra, Ice cores, Heavy water, Statistical analysis, Periodic variations
The complexity of climate variability on all time scales requires the use of several refined tools to unravel its primary dynamics from observations. The authors review the properties of several modern time series analysis methods. Those methods belong to four main classes: Fourier techniques (Blackman-Tukey and Multi-Taper), Maximum Entropy technique, Singular-spectrum techniques and wavelet analysis. Their respective advantages and limitations are illustrated by numerical experiments on synthetic time series. As climate data can be irregularly spaced in time, three interpolating methods on those time series are also compared. These tests are aimed at showing the pitfalls of the blind use of mathematical or statistical techniques on climate data. The authors apply those methods to 'real' climatic data from temperature variations over the last century, and the Vostok ice core deuterium record over the last glacial cycle. Then it is shown how interpretations on the dynamics of climate can be derived on those time scales. (Auth. mod.)

51-3586
Cosmogenic ^{36}Cl dating of the Foothills erratics train, Alberta, Canada.
Jackson, L.E., Jr., Phillips, F.M., Shimamura, K., Little, E.C., *Geology,* Mar. 1997, 25(3), p.195-198, 31 refs.
Pleistocene, Glacial geology, Glacier oscillation, Coalescence, Quaternary deposits, Glacial deposits, Rock properties, Glacial erosion, Radioactive age determination, Isotope analysis, Gamma irradiation, Canada—Alberta—Foothills

51-3587
Climatic effects of glacial Lake Agassiz in the midwestern United States during the last deglaciation.
Hu, F.S., Wright, H.E., Jr., Ito, E., Lease, K., *Geology,* Mar. 1997, 25(3), p.207-210, 31 refs.
Paleoclimatology, Climatic changes, Lacustrine deposits, Glacial lakes, Meltwater, Lake effects, Cooling, Paleoecology, Vegetation patterns, Palynology, Isotope analysis, Correlation

51-3588
Stable carbon and oxygen isotope shifts in Permian seas of West Spitsbergen—global change or diagenetic artifact?
Mii, H.S., Grossman, E.L., Yancey, T.E., *Geology,* Mar. 1997, 25(3), p.227-230, 32 refs.
Pleistocene, Global change, Marine geology, Marine deposits, Stratigraphy, Diagenesis, Carbon isotopes, Paleoecology, Isotope analysis, Radioactive age determination, Norway—Spitsbergen

51-3589
Middle Holocene dry climate caused by change in atmospheric circulation patterns: evidence from lake levels and stable isotopes.
Yu, Z.C., McAndrews, J.H., Eicher, U., *Geology,* Mar. 1997, 25(3), p.251-254, 32 refs.
Paleoclimatology, Climatic changes, Atmospheric circulation, Lacustrine deposits, Oxygen isotopes, Isotope analysis, Drill core analysis, Lake water, Water level, Moisture transfer, Wind factors

51-3590
Passive margin uplift around the North Atlantic region and its role in Northern Hemisphere late Cenozoic glaciation: comment and reply.
van der Beek, P., Rohrman, M., Eyles, N., *Geology,* Mar. 1997, 25(3), p.282-283, 28 refs. For pertinent paper see 50-3386.
Pleistocene, Paleoclimatology, Marine geology, Glaciation, Tectonics, Sedimentation, Continental drift, Theories, Atlantic Ocean

51-3591
White stuff—it can cost plenty of green and leave budgets in the red.
Black, T., *American city & county,* Apr. 1997, 112(4), p.32,35-36,38.
Snow removal, Ice control, Winter maintenance, Road icing, Salting, Weather forecasting, Cost analysis

51-3592
Power sweepers speed up city's snow removal.
American city & county, Apr. 1997, 112(4), p.39.
Snow removal equipment, Cold weather performance, Road maintenance, Winter maintenance

51-3593
Public, private sectors cooperate to plow streets.
American city & county, Apr. 1997, 112(4), p.40-41.
Winter maintenance, Snow removal, Road maintenance, Snow removal equipment, Cost analysis, Urban planning

51-3594
Quality of hydrometeorological data in cold regions.
Peck, E.L., *American Water Resources Association. Journal,* Feb. 1997, 33(1), p.125-134, 33 refs.
Hydrologic cycle, Watersheds, Weather stations, Geophysical surveys, Meteorological data, Snow courses, Precipitation gages, Site surveys, Snow cover distribution, Correlation, Accuracy, Forecasting, Statistical analysis

51-3595
Discussion—"A comparison of geostatistical methodologies used to estimate snow water equivalent," by Steven S. Carroll and Noel Cressie.
Garen, D.C., Carroll, S.S., Cressie, N., *American Water Resources Association. Journal,* Feb. 1997, 33(1), p.219-222, Includes reply. 6 refs. For pertinent paper see 50-4409.
Snow surveys, Snow cover structure, Snow hydrology, Snow water equivalent, Mapping, Statistical analysis, Accuracy, Mathematical models, Forecasting

51-3596
HETEK—method for test of the frost resistance of high performance concrete.
Laugesen, P., Geiker, M., Pedersen, E.J., Thaulow, N., Thøgersen, F., *Denmark. Road Directorate. Report,* 1996, No.55, 68p., Refs. p.59-66.
Road maintenance, Winter maintenance, Research projects, Construction materials, Concrete pavements, Concrete durability, Frost resistance, Frost action, Damage, Freeze thaw tests, Mechanical tests, Standards, Cold weather performance

51-3597
Active microwave signatures of snow covers at 5.3 and 35 GHz.
Strozzi, T., Wiesmann, A., Mätzler, C., *Radio science,* Mar.-Apr. 1997, 32(2), p.479-495, 23 refs.
Snow surveys, Alpine landscapes, Snow cover structure, Snow recrystallization, Snow water equivalent, Microwaves, Classifications, Backscattering, Snow optics, Sensors, Statistical analysis, Models

51-3598
Signatures of polar cap patches in ground ionosonde data.
James, H.G., MacDougall, J.W., *Radio science,* Mar.-Apr. 1997, 32(2), p.497-513, 32 refs.
Polar atmospheres, Atmospheric electricity, Ions, Ionization, Sounding, Wave propagation, Drift, Scattering, Ion density (concentration), Models, Simulation

51-3599
Photographic survey of the epibenthic megafauna of the Arctic Laptev Sea shelf: distribution, abundance, and estimates of biomass and organic carbon demand.
Piepenburg, D., Schmid, M.K., *Marine ecology progress series,* Feb. 27, 1997, 147(1-3), p.63-75, Refs. p.73-75.
Marine biology, Oceanographic surveys, Biomass, Distribution, Ecosystems, Bottom sediment, Sampling, Photographic reconnaissance, Classifications, Statistical analysis, Nutrient cycle, Russia—Laptev Sea

51-3600
Biosynthesis of macromolecular and lipid classes by phytoplankton in the Northeast Water Polynya.
Smith, R.E.H., Gosselin, M., Kattner, G., Legendre, L., Pesant, S., *Marine ecology progress series,* Feb. 27, 1997, 147(1-3), p.231-242, 45 refs.
Marine biology, Plankton, Biomass, Polynyas, Ecosystems, Classifications, Nutrient cycle, Geochemical cycles, Ice cover effect, Sampling, Statistical analysis, Greenland—Northeast Water Polynya

51-3601
Photophysiology and photoacclimation in surface sea ice algae from McMurdo Sound, Antarctica.
Robinson, D.H., Kolber, Z., Sullivan, C.W., *Marine ecology progress series,* Feb. 27, 1997, 147(1-3), p.243-256, 59 refs.
Marine biology, Microbiology, Ecosystems, Biomass, Algae, Photosynthesis, Ice shelves, Ponds, Solar radiation, Light effects, Damage, Acclimatization, Antarctica—McMurdo Sound
This study investigates the photophysiology of surface pond communities associated with the fast ice in McMurdo Sound. Photosynthesis-irradiance characteristics, pigmentation, absorption characteristics and the efficiency of energy conversion at photosystem II (PSII) were examined for natural algal populations freshly collected from the field and those subjected to laboratory incubations under controlled light conditions. Results indicate that surface ice algae employ mechanisms to dissipate excess excitation energy and that they have a high level of tolerance to photoinhibitory damage. These characteristics, however, offer only a limited acclimation to the high irradiance of the surface ice habitat. (Auth. mod.)

51-3602
Paleomagnetic investigations of carboniferous sediments from the Intra-Sudetic Basin, southern Poland. Part I: Stephanian-Autunian deposits.
Kądziałko-Hofmokl, M., El-Hemaly, I.A., *Acta geophysica polonica,* 1996, 44(3), p.251-276, Refs. p.273-276.
Pleistocene, Tectonics, Quaternary deposits, Magnetic surveys, Sedimentation, Rock magnetism, Geomagnetism, Remanent magnetism, Orientation, Sampling, Poland—Intra-Sudetic Basin

51-3603
Multiradar observations of medium-scale acoustic gravity waves using the Super Dual Auroral Radar Network.
Bristow, W.A., Greenwald, R.A., *Journal of geophysical research,* Nov. 1, 1996, 101(A11), p.24,499-24,511, 24 refs.
Sound waves, Gravity waves, Radar echoes, Remote sensing, Atmospheric circulation, Atmospheric physics, Canada—Labrador—Goose Bay, Canada—Saskatchewan—Saskatoon, Canada—Ontario—Kapuskasing, Iceland—Stokkseyri

51-3604
Strategy for polar science 1995-2000.
Great Britain. Natural Environment Research Council, Swindon, UK, Natural Environment Research Council, 1995, 61p., Append. 1 contains contact addresses for NERC affiliates and other institutions/organisations. Append. 2 is a list of acronyms and abbreviations.
Research projects, Polar regions
The publication contains a statement of the British view of a polar research strategy, its relevance, programs, perceived science needs into the 21st century, and specific areas of needed research. The global nature of projected programs includes substantial commitment in both arctic and antarctic regions.

51-3605

Increased plant growth in the northern high latitudes from 1981-1991.

Myneni, R.B., Keeling, C.D., Tucker, C.J., Asrar, G., Nemani, R.R., *Nature,* Apr. 17, 1997, 386(6626), p.698-702, 22 refs.

Plants (botany), Vegetation patterns, Growth, Air temperature, Remote sensing, Measuring instruments

51-3606

North and northeast Greenland ice discharge from satellite radar interferometry.

Rignot, E.J., Gogineni, S.P., Krabill, W.B., Ekholm, S., *Science,* May 9, 1997, 276(5314), p.934-937, Refs. and notes p.936-937.

Glaciers, Icebergs, Sea ice, Remote sensing, Radar echoes, Glacier flow, Calving, Greenland, Arctic Ocean

51-3607

Ballistic perforation of graphite/epoxy composite.

Dutta, P.K., Farrell, D., Taylor, S., Tadayon, A., Hui, D., SR 96-29, *U.S. Army Cold Regions Research and Engineering Laboratory. Special Report,* Dec. 1996, 8p., ADA-321 109, 13 refs.

Impact tests, Composite materials, Fracturing, Brittleness

This report documents the experimental details of impact studies performed on graphite/epoxy laminated plates by spherical projectiles. The mechanism of failure and energy absorption were studied by macro- and microscopic examination of the surfaces of the laminates. Fragments were examined under scanning electron microscope to determine presence of any characteristic fracture surface pattern. The influence of laminate orientations was studied using unidirectional and quasi-isotropic laminates. The scanning electron microscopic examination of the fragments from the impact shows that the fracture surfaces of the matrix have some characteristic hackle marks. A discussion is provided to explain the characteristics and texture of these hackle marks and relate them to the impact velocity, material brittleness, and energy absorption of the impact.

51-3608

Investigation of the kinetics and products resulting from the reaction of peroxone with aminodinitrotoluenes.

Spanggord, R.J., Yao, D., Mill, T., SR 97-05, *U.S. Army Cold Regions Research and Engineering Laboratory. Special Report,* Feb. 1997, 13p., ADA-323 601, 7 refs.

Ozone, Waste treatment, Ground water

The reaction between peroxone and two isomers of aminodinitrotoluene (ADNT) was studied with respect to kinetics of reaction and the products formed. The ADNTs react rapidly with ozone and hydroxyl radical, the principal components of peroxone. At fairly high ADNT concentrations (ppm), hydroxyl radical competes with ozone in pure water systems. Reactions of both the 2- and 4-ADNT isomers result in the formation of pyruvic acid, nitrate ion, and nitrite ion. A reaction mechanism consistent with these products is proposed.

51-3609

Dispersion by chemical reaction of Rocky Mountain Arsenal Basin F waste soils.

Payne, J.R., Marion, G.M., SR 97-03, *U.S. Army Cold Regions Research and Engineering Laboratory. Special Report,* Feb. 1997, 16p., ADA-323 602, 9 refs.

Soil pollution, Sludges, Leaching, Land reclamation, Waste treatment, Soil chemistry

Many military installations have soil contamination problems that range from heavy metals to petroleum products. Rocky Mountain Arsenal (RMA) Basin F contains high concentrations of salts, heavy metals, ammonia, urea, and organics. The Dispersion by Chemical Reaction (DCR) process leads to a reduction in the mobility of the organic and inorganic constituents by first removing volatile constituents via steam stripping and volatilization, then trapping the nonvolatile contaminants in a nonmobile phase (microencapsulation), and finally compacting the treated material into large soil bodies (macroencapsulation). This report summarizes the results of the DCR testing of soil-amended Basin F sludge from RMA. The primary focus of this study is on pesticide leachability. The DCR process used to treat the Basin F waste soil produced a dry, homogeneous, soil-like material with desirable physical properties that on compaction achieved the following remediation goals: reduction of all leachable volatiles to nondetectable levels, confinement of all metals to below Resource Recovery and Conservation Act Toxic Characteristics Leaching Procedure (RCRA TCLP) levels, and a decrease in pesticide leachability to levels approaching RCRA standards.

51-3610

Stripping volatile organic compounds and petroleum hydrocarbons from water by tray aeration.

LaBranche, D.F., Collins, M.R., SR 97-06, *U.S. Army Cold Regions Research and Engineering Laboratory. Special Report,* Mar. 1997, 15p., ADA-323 603, 23 refs.

Ground water, Water pollution, Crude oil, Hydrocarbons, Waste disposal, Land reclamation

Volatile organic compounds (VOCs) and petroleum products are ubiquitous groundwater contaminants. Petroleum products, e.g., diesel fuel, contain a wide array of volatile, semivolatile, and long-chain hydrocarbon compounds. This research sought to determine whether air stripping can provide a site-specific treatment solution for petroleum-contaminated groundwaters and to document the abilities and limitations of tray-type (ShallowTray) air stripping technology. Full factorial experimental trials were conducted to determine the influence of inlet water flow rate and temperature on trichloroethylene (TCE), perchloroethylene (PCE) and total petroleum hydrocarbon (TPH) removal. As expected, TPH removal controlled air stripper performance, and liquid temperature affected removal more than flow rate. The mass transfer rate of TCE and PCE from water to air was controlled by the compound's volatility, while the TPH mass transfer rate was controlled by the compound's concentration gradient. Results indicate that economical air stripping of VOC and TPH compounds can be achieved using low liquid flow rates (20-75L/min) and medium liquid temperatures (16-28°C) in tray-type air strippers.

51-3611

Frost shielding protection of a water line, Berlin, New Hampshire.

Coutermarsh, B.A., SR 97-01, *U.S. Army Cold Regions Research and Engineering Laboratory. Special Report,* Jan. 1997, 15p., ADA-322 268, 7 refs.

Frost penetration, Pipeline freezing, Pipeline insulation, Underground pipelines, Frost protection, Design, Mathematical models

The standard practice of burying water and sewer lines beneath the frost line in cold regions can be expensive when ledge or other difficult material is within the burial depth. If the pipeline can be buried at a shallower depth and still be protected from freezing, a significant savings in excavation costs can be realized. A finite element (FE) program was developed to predict frost penetration depth around buried utility pipelines. The program was used to design and assess the feasibility of various insulation configurations around a water line buried within the frost-susceptible depth in Berlin, NH. Extensive temperature monitoring was performed to evaluate both the insulation design and the prediction accuracy of the FE program. The first-year results are very promising, showing good accuracy between the FE results and actual temperatures.

51-3612

Sampling trace-level organics with polymeric tubings: dynamic studies.

Parker, L.V., ed, Ranney, T.A., ed, SR 97-02, *U.S. Army Cold Regions Research and Engineering Laboratory. Special Report,* Jan. 1997, 22p., ADA-322 645, 30 refs. See also 50-5672.

Pipes (tubes), Leaching, Ground water, Plastics

This study is the second phase of a two-year effort to determine the effects that sampling tubings have on organic analyte concentrations. In the first year, 20 different tubings were compared, under static conditions, with respect to sorption of organic contaminants and leaching of organic constituents. In this study, the authors examined what occurs under dynamic conditions when TCE-contaminated water is pumped through several different types of polymeric tubings. Sorption of organic solutes, leaching of organic constituents, and desorption of sorbed organic contaminants were all examined. Five tubings were selected for this study: a rigid fluoropolymer, a flexible fluoropolymer, low-density polyethylene (LDPE), and two plasticized polypropylene tubings. These materials were selected because the static studies had shown that these tubings leached little or no organic constituents (as determined by HPLC analyses with an ultraviolet [UV] detector) and ranged from being the least sorptive tubings tested to among the most highly sorptive. The effects of tubing length and flow rate were examined. Results from these studies indicate that if water is pumped through tubing at a slow flow rate (100 mL/min), fluoropolymers should be used to prevent extensive losses of TCE and more sorptive analytes, especially if the tubing is 50 ft or longer. If a faster flow rate (1 L/min) is used, it appears that LDPE tubing can be used to sample TCE and other less sorptive analytes, although time for equilibration (2-4 hr) should be allowed to reduce losses in the deepest wells.

51-3613

1994 Arctic Ocean section: the first major scientific crossing of the Arctic Ocean.

Tucker, W., ed, Cate, D., ed, SR 96-23, *U.S. Army Cold Regions Research and Engineering Laboratory. Special Report.* Sep. 1996, 117p., ADA-322 259.

Global change, Water pollution, Environmental impact, Icebreakers, Air ice water interaction, Oceanography, Sea ice, Marine biology, Bacteria, Plankton, Algae, Radioactivity, Remote sensing, Ice navigation, Expeditions, Ocean currents, Geochemistry, Arctic Ocean

In the summer of 1994 seventy scientists aboard two icebreakers—the USCGC *Polar Sea* and the CCGS *Louis S. St-Laurent*—participated in the U.S.-Canada Arctic Ocean Section, the first major scientific crossing of the Arctic Ocean. The purpose of the expedition was to increase understanding of the Arctic Ocean in the context of global change and to gather baseline data on contaminants. Data were collected at 39 locations, beginning just north of Nome, AK, crossing the North Pole, and finishing east of Greenland. Fifty individual research projects resulted in measurements of the seafloor, the ocean, the ice and the atmosphere, producing a comprehensive view of the Arctic Ocean never before available.

51-3614

Changes in freezing bound water in water-gellan systems with structure formation.

Hatakeyama, T., Quinn, F.X., Hatakeyama, H., *Carbohydrate polymers,* 1996, Vol.30, p.155-160, 15 refs.

Hygroscopic water, Colloids, Molecular structure, Frozen liquids, Phase transformations, Liquid phases, Solid phases

51-3615

CPT study of the effect of unfrozen water content on strength of silty permafrost at Kangiqsualujjuaq, Nunavik (Quebec).

Fortier, R., Ladanyi, B., Allard, M., Canadian Geotechnical Conference, 46th annual, Saskatoon, Saskatchewan, Sep. 27-29, 1993. Proceedings, Rexdale, Ontario, Canadian Geotechnical Society, [1993], p.307-318, 23 refs.

Estuaries, Frost mounds, Subsea permafrost, Permafrost thermal properties, Permafrost structure, Unfrozen water content, Ground ice, Saline soils, Frozen ground strength, Soil creep, Soil tests, Penetration tests, Canada—Quebec—Kangiqsualujjuaq

51-3616

Antenna and tower icing.

Jones, E.R., Davies, D.K., Farahani, M.R.J., *Communications,* June 1990, 27(6), p.61,63,65,66,68,70, 3 refs.

Antennas, Towers, Power line supports, Power line icing, Ice accretion, Glaze, Ice loads, Wind pressure, Design criteria

51-3617

Research note on sea ice in the vicinity of Showa Station, Antarctica. [Nankyoku Showa kichi shuhen no kaihyo kenkyu noto]

Yoshida, Y., *Rissho daigaku Bungakubu kenkyu kiyo (Rissho [Nichiren Buddhist] University, Tokyo. Faculty of Letters. Research bulletin),* Mar. 1997, No.13, p.35-47, In Japanese. 24 refs.

Sea ice distribution, Ice conditions, Fast ice, Ice navigation, Polynyas, Ice cracks, Ice breakup, Antarctica—Showa Station, Antarctica—Lützow-Holm Bay

A general review is presented of observations from 1957-1991 on the extent and variations in sea ice, both floating ice and fast ice, between summer and winter in Lützow-Holm Bay. Incidents are cited when even in the summer, navigation was difficult in the fast ice because polynyas and leads open and close without warning. In the winter, polynyas have formed in first year ice, and polynyas and leads were also observed in fast ice in the winters of 1968, 1980, and 1983, apparently associated with blizzards. In all seasons, the fast ice is subject to the action of wind, tides and particularly, glacier tongues, which form cracks in the ice and may impede vehicle traffic.

51-3618

Headquarters oil spill response manual.

U.S. National Science Foundation. Office of Polar Programs, Arlington, VA, 1996, Var. p., Prepared by Jamestown Marine Services, Inc., Jamestown, RI, for NSF/OPP in Sep. 1995, revised by NSF in Oct. 1996.

Oil spills, Accidents, Soil pollution, Water pollution, Waste disposal, Oil recovery, Environmental protection, Regional planning, Land reclamation, Manuals

Recognizing that fuel spills represent the single greatest threat to the antarctic environment, the National Science Foundation, Office of Polar Programs (NSF,OPP) initiated the Oil Spill Prevention and Response Plan Project in Sep. 1990. The project is in direct support of the OPP's *Environmental Protection Agenda* Oil Spill Prevention Action Item and the NSF Office of General Counsel's *Strategy for Compliance with Environmental Law in Antarctica*. The project has developed several oil spill response contingency plans in accordance with guidance prepared under the direction of the Standing Committee on Antarctic Logistics and Operations (SCALOP) by the SCALOP subgroup on Oil Spill Prevention and Response and approved by the Council of Managers, National Antarctic Programs (COMNAP). The spill response contingency plans are complemented by a comprehensive *USAP Spill Prevention, Control and Countermeasures Plan (SPCC)*. This manual provides guidance to the Headquarters Emergency Management and Response Team (HEMART) to support facility and area response actions. Oil spills, no matter how small, must be reported and cleaned up. (Auth. mod.)

51-3619

Vertical ice loads on offshore structures due to changes in water levels.

Kioka, S., Ito, S., Saeki, H., Terashima, T., Marine technology and transportation. Edited by T. Graczyk, et al, Southampton, England, Computational Mechanics Publications, 1995, p.199-208, 5 refs. Presented at the 1st International Conference on Marine Technology (ODRA 95), Szczecin, Poland, Sep. 1995.

DLC VM5.M34 1995

Offshore structures, Piers, Ice solid interface, Ice adhesion, Ice loads, Ice pressure, Ice cover strength, Ice breaking, Water level, Mathematical models

51-3620

Ice loads acting on structures to which ice sheets are adfrozen during flooding and measures to decrease ice loads.

Terashima, T., Nakazawa, N., Kioka, S., Hirano, A., Saeki, H., Marine technology and transportation. Edited by T. Graczyk, et al, Southampton, England, Computational Mechanics Publications, 1995, p.209-218, 12 refs. Presented at the 1st International Conference on Marine Technology (ODRA 95), Szczecin, Poland, Sep. 1995.

DLC VM5.M34 1995

Offshore structures, Ice solid interface, Ice adhesion, Ice loads, Ice pressure, Ice water interface, Ice control, Flooding, Water level, Mathematical models

51-3621

Floating ice thickness for aircraft operations.

Sinha, N.K., ed, Argue, G.H., ed, Cai, B.L., ed, Mah, V.Y.F., ed, Ottawa, Transport Canada, Airports, Safety and Technical Services, 1996, 11p. + appends., 30 refs.

Ice runways, Ice cover thickness, Ice cover strength, Flexural strength, Manuals, Mathematical models

51-3622

Calcium magnesium acetate (CMA)—an alternative deicing agent. A review of the literature.

Ihs, A., Gustafson, K., *Swedish National Road and Transport Research Institute (Statens väg- och transportforskningsinstitut). VTI meddelande,* 1996, No.789A, 29p., 44 refs. For Swedish version see 51-492.

Road icing, Chemical ice prevention, Salting, Environmental impact, Concrete pavements, Corrosion, Road maintenance, Cost analysis

51-3623

Evaluation of CMA/NaCl-mixture. Effect on road condition/friction, ice melting capacity, corrosion and effect on concrete.

Ihs, A., Gustafson, K., Persson, K., *Swedish National Road and Transport Research Institute (Statens väg- och transportforskningsinstitut). VTI meddelande,* 1996, No.788A, 98p. + append., 10 refs. For Swedish version see 51-491.

Road icing, Chemical ice prevention, Salting, Skid resistance, Concrete pavements, Corrosion, Road maintenance

51-3624

Hydraulics of ice-covered rivers.

Beltaos, S., Issues and directions in hydraulics. Edited by T. Nakato and R. Ettema, Rotterdam, A.A. Balkema, 1996, p.159-166, 23 refs. Proceedings of an Iowa Hydraulics Colloquium, Iowa City, May 22-24, 1995.

River ice, Freezeup, Ice breakup, Frazil ice, Bottom ice, Ice jams, Ice cover effect, Ice water interface, River flow, Hydraulics

51-3625

Understanding the properties of river and lake ice.

Timco, G.W., Issues and directions in hydraulics. Edited by T. Nakato and R. Ettema, Rotterdam, A.A. Balkema, 1996, p.167-178, 30 refs. Proceedings of an Iowa Hydraulics Colloquium, Iowa City, May 22-24, 1995.

River ice, Lake ice, Ice structure, Ice cover strength, Ice loads, Ice pressure, Ice friction, Ice creep, Ice pileup

51-3626

Note on the Iowa low-temperature flow facility—discussion.

Larsen, P., Issues and directions in hydraulics. Edited by T. Nakato and R. Ettema, Rotterdam, A.A. Balkema, 1996, p.179-180, Proceedings of an Iowa Hydraulics Colloquium, Iowa City, May 22-24, 1995.

Cold chambers, Ice bottom surface, Ice water interface, Laboratories

51-3627

Hydraulics of ice-covered rivers—discussion.

Guo, Q.Z., Issues and directions in hydraulics. Edited by T. Nakato and R. Ettema, Rotterdam, A.A. Balkema, 1996, p.181-183, 1 ref. Proceedings of an Iowa Hydraulics Colloquium, Iowa City, May 22-24, 1995.

River ice, Ice breakup, Ice jams, Ice water interface, River flow, Hydraulics

51-3628

Norway spruce present in the Scandes Mountains, Sweden at 8000 BP: new light on Holocene tree spread.

Kullman, L., *Global ecology and biogeography,* Mar. 1996, 5(2), p.94-101, 34 refs.

Trees (plants), Revegetation, Migration, Paleoecology, Paleoclimatology, Forest lines, Vegetation patterns, Snow cover effect, Sediments, Radioactive age determination, Biogeography, Sweden—Scandes Mountains

51-3629

Stable isotope record from Seneca Lake, New York: evidence for a cold paleoclimate following the Younger Dryas.

Anderson, W.T., Mullins, H.T., Ito, E., *Geology,* Feb. 1997, 25(2), p.135-138, 17 refs.

Paleoclimatology, Glacier melting, Meltwater, Climatic changes, Air temperature, Cooling, Lacustrine deposits, Drill core analysis, Radioactive age determination, Isotope analysis, Ice cores, Correlation, United States—New York—Seneca Lake

51-3630

Overconsolidated section on the Yermak Plateau, Arctic Ocean: ice sheet grounding prior to ca. 660ka?

Flower, B.P., *Geology,* Feb. 1997, 25(2), p.147-150, 33 refs.

Pleistocene, Marine geology, Glacial geology, Grounded ice, Ice sheets, Sedimentation, Quaternary deposits, Marine deposits, Stratigraphy, Oxygen isotopes, Isotope analysis, Geochronology, Arctic Ocean

51-3631

Vertical stratification of tropical cloud properties as determined from satellite.

Sheu, R.S., Curry, J.A., Liu, G.S., *Journal of geophysical research,* Feb. 27, 1997, 102(D4), p.4231-4245, 34 refs.

Clouds (meteorology), Cloud cover, Classifications, Cloud physics, Radiometry, Spacecraft, Brightness, Cloud height indicators, Stratification, Ice crystals, Ice detection, Water content

51-3632

Measurement of surface radiation fluxes and cloud optical properties during the 1994 Arctic Ocean Section.

Lubin, D., Simpson, A.S., *Journal of geophysical research,* Feb. 27, 1997, 102(D4), p.4275-4286, 37 refs.

Climatology, Polar atmospheres, Marine atmospheres, Cloud cover, Optical properties, Cloud physics, Turbidity, Insolation, Radiation balance, Radiance, Infrared spectroscopy, Photometry, Spectra, Arctic Ocean

51-3633

Impact of the atmosphere on surface radiative fluxes and snowmelt in the Arctic and subarctic.

Zhang, T., Bowling, S.A., Stamnes, K., *Journal of geophysical research,* Feb. 27, 1997, 102(D4), p.4287-4302, 33 refs.

Climatology, Global warming, Atmospheric composition, Water vapor, Snow hydrology, Snow surface temperature, Snowmelt, Seasonal variations, Air temperature, Temperature inversions, Radiation balance, Snow air interface, Mathematical models

51-3634

200-year ^{210}Pb record from Greenland.

Dibb, J.E., Clausen, H.B., *Journal of geophysical research,* Feb. 27, 1997, 102(D4), p.4325-4332, 22 refs.

Geochronology, Accuracy, Ice sheets, Firn, Ice cores, Aerosols, Fallout, Profiles, Impurities, Isotope analysis, Radioactive age determination, Periodic variations, Statistical analysis, Greenland

51-3635

Effect of wind on surface hoar growth on snow.

Hachikubo, A., Akitaya, E., *Journal of geophysical research,* Feb. 27, 1997, 102(D4), p.4367-4373, 12 refs.

Snow physics, Snow crystal growth, Surface roughness, Meteorological factors, Snow crystal structure, Hoarfrost, Snow air interface, Water vapor, Condensation, Mass transfer, Turbulent exchange, Wind velocity, Wind factors

51-3636

On the extraordinary katabatic winds of Adélie Land.

Wendler, G., Stearns, C., Weidner, G., Dargaud, G., Parish, T., *Journal of geophysical research,* Feb. 27, 1997, 102(D4), p.4463-4474, 42 refs.

Wind (meteorology), Wind velocity, Records (extremes), Atmospheric disturbances, Velocity measurement, Ice cover effect, Topographic effects, Fluid dynamics, Blowing snow, Seasonal variations, Antarctica—Adélie Coast

In Dec. 1992, the authors placed four automatic weather stations along the coast of Adélie Land, two in the maximum wind jet (Port Martin and Cape Denison) and one on each side of this jet (D 10 close to Dumont d'Urville and Penguin Point, respectively). Wind velocities are discussed as a function of other meteorological parameters. Further, the interrelationships between the stations are described. Some of the findings are (1) the very high wind speeds reported earlier this century are in agreement with the measurements; the wind directional constancy is high; (2) historic measurements reported Cape Denison to be the windiest station, not only for Antarctica, but also close to sea level for planet Earth; (3) very strong wind speeds have a more down-slope direction than weaker ones; (4) the general atmospheric pressure gradient enhanced or inhibited the gravity flow; this is especially pronounced in summer; and (5) in summer, above normal pressure is correlated with above normal temperatures; in fall the opposite holds true. (Auth. mod.)

51-3637

Brittle failure of columnar saline ice under triaxial compression.

Gratz, E.T., Schulson, E.M., *Journal of geophysical research,* Mar. 10, 1997, 102(B3), p.5091-5107, 32 refs.

Ice mechanics, Ice strength, Salt ice, Strain tests, Dynamic loads, Brittleness, Stress concentration, Thin sections, Ice microstructure, Cracking (fracturing), Orientation, Phase transformations

51-3638

Grain-size-induced weakening of H_2O ices I and II and associated anisotropic recrystallization.

Stern, L.A., Durham, W.B., Kirby, S.H., *Journal of geophysical research,* Mar. 10, 1997, 102(B3), p.5313-5325, 29 refs.

Ice physics, Extraterrestrial ice, Regolith, Rheology, High pressure ice, Simulation, Ice strength, Ice creep, Stress concentration, Anisotropy, Grain size, Regelation, Ice deformation, Mechanical tests, Scanning electron microscopy

51-3639

Vehicle traction experiments on snow and ice.

Navin, F., Macnabb, M., Nicolletti, C., SAE International Congress and Exhibition, Detroit, MI, Feb. 26-29, 1996. Technical paper No.960652, Warrendale, PA, Society of Automotive Engineers, 1996, p.39-49, 15 refs.

Road icing, Traction, Rubber ice friction, Sanding, Skid resistance, Aggregates, Abrasion, Physical properties, Mechanical tests, Standards, Vehicles, Cold weather performance

51-3640

Characteristic and genesis of moraine-derived flowtill varieties.

Zieliński, T., van Loon, A.J., *Sedimentary geology,* 1996, Vol.101, p.119-143, 66 refs.

Glacial geology, Moraines, Sediment transport, Glacier ablation, Meltwater, Water erosion, Mass flow, Soil formation, Lithology, Classifications, Profiles

51-3641

Defect structure and molecular dynamics of doped ice and natural snow.

Gran, H.C., Hansen, E.W., Pedersen, B., *Acta Chemica Scandinavica,* 1997, Vol.51, p.24-30, 27 refs.

Ice physics, Doped ice, Snowmelt, Meltwater, Snow impurities, Molecular structure, Orientation, Nuclear magnetic resonance, Defects, Ice relaxation, Molecular energy levels, Spectra, Temperature effects

51-3642

Parallel data characterization methods for environmental factors.

LaPotin, P.J., McKim, H.L., MP 4024, International Seminar on Environmental Problems of Demilitarization, 2nd, Naroch, Republic of Belarus, Apr.17-20, 1995. 1995, p.2-19, 33 refs.

Geophysical surveys, Remote sensing, Imaging, Detection, Spectra, Resolution, Classifications, Data processing, Computer applications, Statistical analysis, Environmental tests, Accuracy

Parallel Data Characterization (PDC) algorithms produce high level descriptions of multispectral and/or hyperspectral data sets acquired from active and passive remote sensing systems. The descriptions include measures of central tendency (expectation), variation, elasticity, curvature, and distribution (skewness and kurtosis). PDC measures are used to build a single discriminant function *f* that is the subject of a formal supervised or unsupervised classification. PDC is shown to be distinctly superior to traditional maximum likelihood classifications since PDC methods can be equally applied when two or more band combinations measure nearly identical spectral features without loss of precision or computational efficiency. In this paper, the foundations of the PDC algorithm are derived and case studies are presented for the discrimination of vegetation and toxic/hazardous wastes using Digital Multispectral Video data and Hyperspectral Airborne Visible/Infrared Imaging Spectrometer data.

51-3644

OAII (Ocean-Atmosphere-Ice Interactions) Western Arctic Shelf-Basin Interactions (SBI) Plan.

Seattle, University of Washington, Applied Physics Laboratory, Polar Science Center, 1997, n.p., Available on World Wide Web http://arcss-oaii.ccpo.odu.edu/SBI_science_plan_ 970506.html.

Polar atmospheres, Marine atmospheres, Atmospheric circulation, Ocean currents, Air ice water interaction, Heat balance, Global warming, Research projects, Data processing, Data transmission

51-3645

ArcticInfo.

Arctic Research Consortium of the United States, Inc. (ARCUS), Fairbanks, 1997, n.p., Available on World Wide Web http://arcus.polarnet.com/ArcticInfo.

Research projects, Organizations, Regional planning, Data processing, Data transmission

51-3646

Antarctic science into the 21st century.

British Antarctic Survey, Cambridge, Natural Environment Research Council, Sep. 1995, 36p.

Research projects, Glaciology

In undertaking a program of first class science through which an active and influential role can be sustained in the antarctic region, the British Antarctic Survey mission is viewed from these points of interest: background information concerning the Antarctic Treaty System and coordination in antarctic research; global change, including atmosphere-sea ice-ocean interactions; sustainable development in environmental protection; framework science; conservation and management; enabling technologies, such as platforms for advanced scientific research; strategy for NERC antarctic science programs other than those of BAS; and international collaboration. Two appendices include a list of contact addresses and a list of acronyms and abbreviations.

51-3647

Report of the British Antarctic Survey 1995-96.

British Antarctic Survey, Cambridge, Natural Environment Research Council, [1996], 145p., Pubs. p.125-134.

Research projects, Glaciology

After summarizing BAS year's important events and scientific discoveries, the highlighted topics are reported in more depth. The following is covered: logistics, BAS operational activities and central facilities; science activities, dealing with antarctic ice cover, climate and geological history, the structure and dynamics of the southern ocean ecosystem, dynamics of antarctic terrestrial and freshwater ecosystems, energy flow and dissipation in geospace, antarctic geographic information and mapping, and humans in isolated polar communities. Several appendices provide BAS' financial background, and lists of 1995 publications and staff in various locations, divisions and ships.

51-3648

Canada Stream: a glacial meltwater stream in Taylor Valley, South Victoria Land, Antarctica.

McKnight, D.M., Tate, C.M., *Journal of the North American Benthological Society,* Mar. 1997, 16(1), p.14-17, 18 refs.

Meltwater, Flow measurement, Glacier melting, Permafrost, Patterned ground, Hydrology, Ecology, Algae, Biomass, Antarctica—Canada Stream

The streams in the McMurdo Dry Valleys contrast with streams in many temperate watersheds because of their unique hydrology, the lack of organic matter inputs from the surrounding landscape, and the perennial nature of the algal mats. The studies of Canada Stream and other streams in the McMurdo Dry Valleys conducted by scientists participating in the New Zealand Antarctic Program in the 1980s provide a solid foundation for further studies of the ecology of these streams. Using data from these studies, the authors have estimated the magnitude of organic matter production and storage in Canada Stream. The sum of the export of organic matter as FBOM and DOM carried by the stream is 263 kg/y. GPP was calculated as 2 times NPP; thus one can multiply NPP by the streambed area to obtain an annual net production of organic matter in the stream of 1701 kg/y. This value is 6.4 X the export carried by the stream, which indicates that organic matter is accumulating on an annual basis in the stream. This conclusion is consistent with the perennial nature of the algal mats.

51-3649

Climate of Scott Base 1957-1992.

Bromley, A.M., *National Institute of Water and Atmospheric Research,* [1994], NIWA/Clim/R/94-002, p.1-20, 5 refs.

Weather observations, Air temperature, Wind (meteorology), Precipitation (meteorology), Snowfall, Antarctica—Scott Base

This paper presents data from synoptic and climatological weather observations carried out from Jan. 1957 through Dec. 1992 at Scott Base. Tabulated data on temperature, including mean air temperature, frequency distributions, annual amplitude and extreme temperatures, temperature anomalies, surface wind and precipitation, including days of snow by month and days of fog by month, are discussed and illustrated.

51-3650

Radiocarbon-dated subfossil stomach oil deposits from petrel nesting sites: novel paleoenvironmental records from continental Antarctica.

Hiller, A., Hermichen, W.D., Wand, U., *Radiocarbon,* 1995, 37(2), International ^{14}C Conference, 15th. Proceedings, p.171-180, 26 refs.

Pleistocene, Glacial geology, Glacier oscillation, Quaternary deposits, Nunataks, Paleoecology, Sediments, Biomass, Decomposition, Stratification, Radioactive age determination, Correlation, Antarctica—Queen Maud Land

51-3651

Ericaceous dwarf shrublands above the Northern Appenine timberline (Italy).

Ferrari, C., Piccoli, F., *Phytocoenologia,* Apr. 7, 1997, 27(1), p.53-76, Refs. p.74-76.

Plant ecology, Ecosystems, Vegetation patterns, Distribution, Forest lines, Alpine landscapes, Sampling, Statistical analysis, Classifications, Snow cover effect, Italy—Apennines

51-3652

Annealing of amorphous ice films.

Hessinger, J., Pohl, R.O., *Journal of non-crystalline solids,* Nov. 1996, 208(1-2), p.151-161, 26 refs.

Ice physics, Amorphous ice, Water films, Ice density, Mechanical properties, Ice vapor interface, Porosity, Shear modulus, Internal friction, Temperature effects, Mechanical tests, Resonance, Extraterrestrial ice, Simulation

51-3653

Paleo-hydrogeology of Late Proterozoic units of southeastern Canadian Cordillera.

Nesbitt, B.E., Muehlenbachs, K., *American journal of Science,* Apr. 1997, 297(4), p.359-392, 32 refs.

Pleistocene, Hydrogeology, Earth crust, Tectonics, Geologic processes, Fluid flow, Temperature variations, Lithology, Geochemistry, Isotope analysis, Rock properties, Models, Canada—Alberta—Louise, Lake

51-3654

Sulphur and heavy metal concentrations in Scots pine bark in northern Finland and the Kola Peninsula.

Poikolainen, J., *Water, air, and soil pollution,* Jan. 1997, 93(1-4), p.395-408, 32 refs.

Plant ecology, Subpolar regions, Air pollution, Fallout, Aerosols, Metals, Mining, Plant tissues, Chemical analysis, Plant physiology, Damage, Environmental tests, Environmental impact, Statistical analysis, Russia—Kola Peninsula, Finland—Lapland

51-3655

Quantum simulation of high-density amorphous ice.

Gai, H.D., Schenter, G.K., Carrett, B.C., *Physical review B,* Dec. 1, 1996, 54(21), p.14873-14876, 22 refs.

Ice physics, Amorphous ice, Deuterium oxide ice, Molecular structure, Ice models, Hydrogen bonds, Molecular energy levels, Vibration, Statistical analysis, Physical properties, Simulation, Theories, Accuracy

51-3656

Line broadening in the collective dynamics of liquid and solid water.

Ruocco, G., Sette, F., Krisch, M., Bergmann, U., Masciovecchio, C., Verbeni, R., *Physical review B,* Dec. 1, 1996, 54(21), p.14892-14895, 16 refs.

Ice physics, Ice acoustics, Deuterium oxide ice, X ray analysis, Scattering, Molecular energy levels, Statistical analysis, Spectra

51-3657

Inherently unstable climate behaviour due to weak thermohaline ocean circulation.

Tziperman, E., *Nature,* Apr. 10, 1997, 386(6625), p.592-595, 31 refs.

Climatic changes, Ocean currents, Water temperature, Salinity, Models, Paleoclimatology, Global change

It is argued here, using a global coupled ocean-atmosphere-ice general circulation model with realistic geography, that there is a wide range of weak mean states of the THC that cannot be stably sustained by the climate system. When the model THC is forced into a state in the unstable range, the THC may rapidly strengthen, collapse or display strong oscillations. The existence of this unstable regime may account for the greater variability of the THC and climate before the Holocene period. The area of coverage includes data from both northern and southern polar regions. (Auth. mod.)

51-3658
Itinerary (Cruise report).
Rachor, E., ed, *Berichte zur Polarforschung,* 1997, No.226, Scientific cruise report of the Arctic Expedition ARK-XI/1 of RV *Polarstern* in 1995. (German-Russian Project LADI: Laptev Sea - Arctic Deep Basin interrelations). Wissenschaftlicher Fahrtbericht über die Arktis-Expedition ARK-XI/1 von 1955 mit FS *Polarstern*, p.2-12, Additional notes. p.A2-A17: Station list with explanations; p.A18-A27: Weather data; p.A28-A38: Hydrochemical data; p.A162-163: Sea ice research and ecology, contact persons; p.A171-172: Research participants, Institutions, Locations, and Disciplines. Refs. p.155-157.
Expeditions, Oceanographic ships, Oceanographic surveys, Arctic Ocean

51-3659
Weather and general ice conditions during ARK XI/1.
Bergholter, U., *Berichte zur Polarforschung,* 1997, No.226, Scientific cruise report of the Arctic Expedition ARK-XI/1 of RV *Polarstern* in 1995. (German-Russian Project LADI: Laptev Sea - Arctic Deep Basin interrelations). Wissenschaftlicher Fahrtbericht über die Arktis-Expedition ARK-XI/1 von 1955 mit FS *Polarstern*, p.13-16, Additional notes. p.A2-A17: Station list with explanations; p.A18-A27: Weather data; p.A28-A38: Hydrochemical data; p.A162-163: Sea ice research and ecology, contact persons; p.A171-172: Research participants, Institutions, Locations, and Disciplines. Refs. p.155-157.
Air temperature, Wind direction, Clouds (meteorology), Sea ice, Ice conditions, Arctic Ocean

51-3660
Physical and chemical oceanography.
Rudels, B., et al, *Berichte zur Polarforschung,* 1997, No.226, Scientific cruise report of the Arctic Expedition ARK-XI/1 of RV *Polarstern* in 1995. (German-Russian Project LADI: Laptev Sea - Arctic Deep Basin interrelations). Wissenschaftlicher Fahrtbericht über die Arktis-Expedition ARK-XI/1 von 1955 mit FS *Polarstern*, p.17-40, Additional notes. p.A2-A17: Station list with explanations; p.A18-A27: Weather data; p.A28-A38: Hydrochemical data; p.A162-163: Sea ice research and ecology, contact persons; p.A171-172: Research participants, Institutions, Locations, and Disciplines. Refs. p.155-157.
Oceanography, Sea water, Water temperature, Ocean currents, Chemical composition, Arctic Ocean, Eurasian Basin

51-3661
Sea ice physics and remote sensing.
Eicken, H., et al, *Berichte zur Polarforschung,* 1997, No.226, Scientific cruise report of the Arctic Expedition ARK-XI/1 of RV *Polarstern* in 1995. (German-Russian Project LADI: Laptev Sea - Arctic Deep Basin interrelations). Wissenschaftlicher Fahrtbericht über die Arktis-Expedition ARK-XI/1 von 1955 mit FS *Polarstern*, p.41-72, Additional notes. p.A2-A17: Station list with explanations; p.A18-A27: Weather data; p.A28-A38: Hydrochemical data; p.A162-163: Sea ice research and ecology, contact persons; p.A171-172: Research participants, Institutions, Locations, and Disciplines. Refs. p.155-157.
Sea ice, Remote sensing, Ice melting, Pressure ridges, Ice cover thickness, Ice microstructure, Sediments, Arctic Ocean, Russia—Laptev Sea

51-3662
Sea ice biology and sedimentology.
Grossmann, S., et al, *Berichte zur Polarforschung,* 1997, No.226, Scientific cruise report of the Arctic Expedition ARK-XI/1 of RV *Polarstern* in 1995. (German-Russian Project LADI: Laptev Sea - Arctic Deep Basin interrelations). Wissenschaftlicher Fahrtbericht über die Arktis-Expedition ARK-XI/1 von 1955 mit FS *Polarstern*, p.73-88, Additional notes. p.A2-A17: Station list with explanations; p.A18-A27: Weather data; p.A28-A38: Hydrochemical data; p.A162-163: Sea ice research and ecology, contact persons; p.A171-172: Research participants, Institutions, Locations, and Disciplines. Refs. p.155-157.
Sea ice, Ice bottom surface, Sediments, Ecology, Photosynthesis, Cryobiology, Algae, Russia—Laptev Sea

51-3663
Marine biology.
Bartel, A., et al, *Berichte zur Polarforschung,* 1997, No.226, Scientific cruise report of the Arctic Expedition ARK-XI/1 of RV *Polarstern* in 1995. (German-Russian Project LADI: Laptev Sea - Arctic Deep Basin interrelations). Wissenschaftlicher Fahrtbericht über die Arktis-Expedition ARK-XI/1 von 1955 mit FS *Polarstern*, p.89-110, Additional notes. p.A2-A17: Station list with explanations; p.A18-A27: Weather data; p.A28-A38: Hydrochemical data; p.A162-163: Sea ice research and ecology, contact persons; p.A171-172: Research participants, Institutions, Locations, and Disciplines. Refs. p.155-157.
Marine biology, Plankton, Sea ice, Bacteria, Biomass, Arctic Ocean, Russia—Laptev Sea, Russia—Siberian Sea, Amundsen Basin

51-3664
Newsletter, No.48, Mar. 1997.
Antarctic Society of Australia, Pymble, New South Wales, 1997, 20p.
Global warming, Climatic changes, Ice melting, Ozone, Research projects, Environmental impact
This issue opens with comments on the effects of global warming in Antarctica, including concern for the retreat of ice shelves and evidence of climatic change. It continues with a note in memory of Sir Douglas Mawson and plans to restore his historic hut; short reports on walking expeditions across the ice; American and Australian aid to the Russians at Mirnyy Station; whale killing legislation; a volcanic eruption at Heard I.; and ANARE miscellaneous news, including a list of forthcoming events.

51-3665
Antarctic automatic weather station data for the calendar year 1995.
Keller, L.M., Weidner, G.A., Stearns, C.R., Whittaker, M.T., Holmes, R.E., Madison, University of Wisconsin, 1997, 33p.
Weather stations, Meteorological data, Air temperature, Atmospheric pressure, Wind velocity
A network of automatic weather station (AWS) units has been deployed to collect antarctic surface weather observations in support of specific meteorological research projects as well as operational activities at McMurdo Station. The 1995 network consisted of 48 installed AWS units providing observations on the Ross Ice Shelf, east of the Transantarctic Mountains and north of McMurdo to the Adélie Coast, along the Antarctic Peninsula and climatological locations such as the South Pole. Each unit measures air temperature, wind speed, and wind direction at a nominal height of 3 m and air pressure at the electronics enclosure. Some AWS units also measure the relative humidity at 3 m and vertical air temperature difference between 0.5 and 3 m. Measurement heights relative to the actual surface at the site are nominal due to snow accumulation around the AWS unit.

51-3666
Holocene key-marker tephra layers in Kamchatka, Russia.
Braitseva, O.A., Ponomareva, V.V., Sulerzhitskiĭ, L.D., Melekestsev, I.V., Bailey, J., *Quaternary research,* Mar. 1997, 47(2), p.125-139, 31 refs.
Quaternary deposits, Volcanic ash, Dispersions, Aerosols, Stratigraphy, Geochronology, Carbon isotopes, Radioactive age determination, Russia—Kamchatka Peninsula

51-3667
Tephrochronologic constraints on the Late Pleistocene history of the southern margin of the Cordilleran Ice Sheet, western Washington.
Begét, J.E., Keskinen, M.J., Severin, K.P., *Quaternary research,* Mar. 1997, 47(2), p.140-146, 19 refs.
Pleistocene, Ice sheets, Glacier oscillation, Glacial deposits, Quaternary deposits, Volcanic ash, Lacustrine deposits, Geochronology, Stratigraphy, Geochemistry, Radioactive age determination, Correlation, United States—Washington

51-3668
Preservation and recognition of Middle and Early Pleistocene loess in the Driftless Area, Wisconsin.
Jacobs, P.M., Knox, J.C., Mason, J.A., *Quaternary research,* Mar. 1997, 47(2), p.147-154, 36 refs.
Pleistocene, Quaternary deposits, Stratigraphy, Loess, Sedimentation, Weathering, Wind erosion, Detection, Classifications, United States—Wisconsin—Driftless Area

51-3669
Tidal oscillations of the arctic upper mesosphere and lower thermosphere in winter.
Oznovich, I., McEwen, D.J., Sivjee, G.G., Walterscheid, R.L., *Journal of geophysical research,* Mar. 1, 1997, 102(A3), p.4,511-4,520, 34 refs.
Atmospheric physics, Wind (meteorology), Oscillations, Periodic variations, Solar radiation, Heating, Atmospheric electricity, Light (visible radiation), Photometry, Spectroscopy

51-3670
Low-level jet simulation over the southern ocean in Antarctica.
Buzzi, A., Cadelli, R., Malguzzi, P., *Tellus,* Mar. 1997, 49A(2), p.263-276, 28 refs.
Climatology, Polar atmospheres, Wind (meteorology), Atmospheric circulation, Atmospheric boundary layer, Topographic effects, Wind direction, Simulation
The authors have examined the dynamical characteristics of an intense topographic low level jet (LLJ) that develops in high-resolution numerical simulations of airflow in the antarctic region. The jet forms off Cape Adare (Victoria Land) over the southern ocean, when a large scale cyclone is present in the region of the Ross Sea and adjacent ocean. A low level easterly airflow is directed towards the portion of Transantarctic Mountains located along the west coast of the Ross Sea, inducing a barrier wind airflow which is locally parallel to the topographic barrier. By means of numerical experiments and model output diagnostics, they have investigated the time evolution of different meteorological parameters, and in particular those relevant for the vorticity budget, associated with the LLJ formation. (Auth. mod.)

51-3671
Satellite observation and climate system model simulation of the St. Lawrence Island polynya.
Lynch, A.H., Glueck, M.F., Chapman, W.L., Bailey, D.A., Walsh, J.E., *Tellus,* Mar. 1997, 49A(2), p.277-297, 53 refs.
Climatology, Sea ice distribution, Polynyas, Drift, Velocity, Friction, Ocean currents, Air ice water interaction, Spaceborne photography, Synthetic aperture radar, Simulation, Models, Bering Sea

51-3672
Holocene lateral expansion, peat growth and carbon accumulation on Haukkasuo, a raised bog in southeastern Finland.
Mäkilä, M., *Boreas,* Mar. 1997, 26(1), p.1-14, 53 refs.
Subarctic landscapes, Wetlands, Soil formation, Paludification, Peat, Growth, Stratigraphy, Distribution, Landscape development, Sampling, Geochemical cycles, Climatic factors, Radioactive age determination, Finland

51-3673
Rapid climatic shifts of the northern Norwegian Sea during the last deglaciation and the Holocene.
Hald, M., Aspeli, R., *Boreas,* Mar. 1997, 26(1), p.15-28, Refs. p.26-29.
Pleistocene, Paleoclimatology, Climatic changes, Ice melting, Marine deposits, Sedimentation, Drill core analysis, Lithology, Paleoecology, Ocean currents, Marine atmospheres, Radioactive age determination, Norwegian Sea

51-3674
Storegga tsunami along the Norwegian coast, its age and runup.
Bondevik, S., Svendsen, J.I., Johnsen, G., Mangerud, J., Kaland, P.E., *Boreas,* Mar. 1997, 26(1), p.29-53, 35 refs.
Marine geology, Subpolar regions, Shoreline modification, Sediment transport, Ocean waves, Lacustrine deposits, Stratigraphy, Landslides, Wave propagation, Sea level, Water level, Radioactive age determination, Norway

51-3675
Mechanism for emplacement and concentration of diatoms in glacigenic deposits.
Burckle, L.H., Kellogg, D.E., Kellogg, T.B., Fastook, J.L., *Boreas,* Mar. 1997, 26(1), p.55-60, 22 refs.
Glacial geology, Pleistocene, Ice sheets, Glacier melting, Water transport, Sediment transport, Glacial deposits, Plankton, Wind factors, Quaternary deposits, Subglacial observations, Bedrock

The occurrence of diatoms (both marine and freshwater) in sediments beneath the West Antarctic Ice Sheet (WAIS) is suggestive of past ice-sheet collapse. However, it is not the only model explaining such occurrences. The authors propose another mechanism for introducing diatoms beneath ice sheets by considering the fate of a diatom placed (by eolian processes) on top of an ice sheet. Mathematical modeling indicates that the route the diatom will take through the ice sheet is dictated by the basal melting rate. If no basal melting takes place, flowlines will crop out at the ice-sheet margin. However, if basal melting is as low as 0.01 m/yr the trajectories of all flowlines except for those nearest the margin will intersect the bed, with those diatoms deposited near the dome reaching the bed about halfway down the flowband. Larger values of basal melting lead to the diatoms reaching the bed even faster and closer to the point of origin. In light of these results, the presence of diatoms in sediments beneath the WAIS does not lead to a unique solution; it is not necessary to invoke past ice-sheet collapse to account for their presence. (Auth. mod.)

51-3676

Luminescence evidence for two Middle Pleistocene interglacial events at Tourville, northwestern France.

Balescu, S., Lamothe, M., Lautridou, J.P., *Boreas*, Mar. 1997, 26(1), p.61-72, Refs. p.70-73.

Pleistocene, Estuaries, Quaternary deposits, Bottom sediment, Stratigraphy, Sampling, Luminescence, Radioactive age determination, France—Tourville

51-3677

'Deforming bed conditions on the Dänischer Wohld Peninsula, northern Germany': comments.

Piotrowski, J.A., et al, *Boreas*, Mar. 1997, 26(1), p.73-80, Includes reply. 46 refs. For pertinent paper see 50-6536.

Pleistocene, Marine geology, Glacial deposits, Lacustrine deposits, Tectonics, Stratigraphy, Glacier beds, Glacier melting, Ice solid interface, Deformation, Germany—Dänischer Wohld Peninsula

51-3678

Temperature dependence of ternary solution particle volumes as observed by lidar in the arctic stratosphere during winter 1992/93.

Beyerle, G., Luo, B.P., Neuber, R., Peter, T., McDermid, I.S., *Journal of geophysical research*, Feb. 20, 1997, 102(D3), p.3603-3609, 32 refs.

Climatology, Polar atmospheres, Polar stratospheric clouds, Cloud physics, Refractivity, Atmospheric density, Aerosols, Liquid phases, Heterogeneous nucleation, Volcanic ash, Lidar, Backscattering, Particle size distribution, Profiles

51-3679

Aerosol-induced chemical perturbations of stratospheric ozone: three-dimensional simulations and analysis of mechanisms.

Zhao, X.P., Turco, R.P., Kao, C.Y.J., Elliot, S., *Journal of geophysical research*, Feb. 20, 1997, 102(D3), p.3617-3637, Refs. p.3635-3637.

Climatology, Global change, Atmospheric composition, Polar atmospheres, Stratosphere, Aerosols, Volcanic ash, Degradation, Ozone, Photochemical reactions, Heterogeneous nucleation, Turbulent diffusion, Simulation, Mathematical models

51-3680

Heterogeneous reactions on stratospheric background aerosols, volcanic sulfuric acid droplets, and type I polar stratospheric clouds: effects of temperature fluctuations and differences in particle phase.

Borrmann, S., Solomon, S., Dye, J.E., Baumgardner, D., Kelly, K.K., Chan, K.R., *Journal of geophysical research*, Feb. 20, 1997, 102(D3), p.3639-3648, 16 refs.

Climatology, Ozone, Degradation, Polar stratospheric clouds, Cloud physics, Phase transformations, Aerosols, Hydrates, Volcanic ash, Heterogeneous nucleation, Temperature effects, Aerial surveys

51-3681

Modeling sea-salt aerosols in the atmosphere 2. Atmospheric concentrations and fluxes.

Gong, S.L., et al, *Journal of geophysical research*, Feb. 20, 1997, 102(D3), p.3819-3830, 21 refs.

Climatology, Polar atmospheres, Atmospheric composition, Aerosols, Salinity, Sampling, Seasonal variations, Geochemical cycles, Antarctica—Palmer Station, Canada—Northwest Territories—Alert

Atmospheric sea-salt aerosol concentrations are studied using both long-term observations and model simulations of Na^+ at seven stations around the globe, including Palmer Station. Good agreement is achieved between observations and model predictions in the Northern Hemisphere. A stronger seasonal variation occurs in the high-latitude North Atlantic than in regions close to the equator and in high-latitude Southern Hemisphere. Generally, concentrations are higher for both boreal and austral winters. With the model, the production flux and removal flux at the atmosphere-ocean interface was calculated and used to estimate the global sea-salt budget. The flux also shows seasonal variation similar to that of sea-salt concentration. Approximately 99% of the sea-salt aerosol mass generated by wind falls back to the sea with about 1-2% remaining in the atmosphere to be exported from the original grid square. Only a small portion of that exported (ca. 4%) is associated with submicron particles that are likely to undergo long-range transport. (Auth. mod.)

51-3682

Activation of chlorine in sulfate aerosols as inferred from aircraft observations.

Kawa, S.R., et al, *Journal of geophysical research*, Feb. 20, 1997, 102(D3), p.3921-3933, Refs. p.3931-3933.

Climatology, Polar atmospheres, Atmospheric composition, Aerosols, Stratosphere, Ozone, Photochemical reactions, Degradation, Heterogeneous nucleation, Aerial surveys, Temperature effects, Models

The abundance of reactive chlorine in the lower stratosphere is observed to increase sharply with exposure to temperatures below about 195 K, a temperature which is near the nitric acid trihydrate (NAT) equilibrium condensation point. Measurements from the NASA ER-2 aircraft and a model of chemistry along back trajectories are used to examine the mechanism for this apparent temperature threshold in chlorine activation. The flight of July 28, 1994, from the Airborne Southern Hemisphere Ozone Experiment/Measurements for Assessing the Effects of Stratospheric Aircraft campaign in the Southern Hemisphere, surrounding Antarctica, is studied because it provides measurements in an ongoing activation episode. The measurements show enhanced ClO and decreased HCl at temperatures below 195 K even in the absence of significant polar stratospheric cloud particle surface area. The model of chemistry along back trajectories, constrained by the ER-2 chemical and microphysical measurements, indicates that an initial inorganic chlorine (Cl_y) partitioning of approximately half HCl and half $ClONO_2$ is consistent with the observations. At this initial Cl_y partitioning, the model using heterogeneous reactions on liquid sulfate and ternary solutions with the most recent sticking coefficient evaluations closely reproduces the latitude gradient and temperature threshold of chlorine activation observed in the data. (Auth. mod.)

51-3683

Partitioning of the reactive nitrogen reservoir in the lower stratosphere of the southern hemisphere: observations and modeling.

Gao, R.S., et al, *Journal of geophysical research*, Feb. 20, 1997, 102(D3), p.3935-3949, 61 refs.

Climatology, Atmospheric composition, Polar atmospheres, Condensation trails, Degradation, Photochemical reactions, Aerosols, Heterogeneous nucleation, Climatic factors, Aerial surveys, Sampling

Measurements of nitric oxide (NO), nitrogen dioxide (NO_2), and total reactive nitrogen were made during austral fall, winter, and spring 1994 as part of the NASA Airborne Southern Hemisphere Ozone Experiment/Measurements for Assessing the Effects of Stratospheric Aircraft mission. Comparisons between measured NO_2 values and those calculated using a steady state (SS) approximation are presented for flights at mid- and high latitudes. The SS results agree with the measurements to within 8%, however, NO_2 values observed in the Concorde exhaust plume were significantly less than SS values. Model comparisons using a full diurnal, photochemical steady state model also show good agreement with the NO and NO_2 measurements, suggesting that the reactions affecting the partitioning of the NO_y reservoir are well understood in the lower stratosphere. (Auth. mod.)

51-3684

Canada-Japan SARES project on the first-year ice of Saroma-ko Lagoon, (northern Hokkaido, Japan) and Resolute Passage (Canadian High Arctic).

Fukuchi, M., Legendre, L., Hoshiai, T., *Journal of marine systems*, Feb. 1997, 11(1-2), Canada-Japan SARES Project on First-Year Sea Ice. Proceedings. Edited by J.C. Therriault et al, p.1-8, 39 refs.

Oceanography, Research projects, International cooperation, Sea ice distribution, Ice surveys, Marine biology, Young ice, Carbon dioxide, Geochemical cycles, Ice water interface, Biomass, Marine biology, Correlation, Japan—Hokkaido, Canada—Northwest Territories—Resolute Passage

51-3685

Oceanic heat fluxes under thin sea ice in Saroma-ko Lagoon, Hokkaido, Japan.

Shirasawa, K., Ingram, R.G., Hudier, E.J.J., *Journal of marine systems*, Feb. 1997, 11(1-2), Canada-Japan SARES Project on First-Year Sea Ice. Proceedings. Edited by J.C. Therriault et al, p.9-19, 25 refs.

Oceanography, Sea ice, Ice heat flux, Latent heat, Young ice, Ice water interface, Buoyancy, Ice cover effect, Turbulent diffusion, Ultrasonic tests, Ice temperature, Temperature variations, Japan—Saroma-ko Lagoon

51-3686

Currents and turbulent fluxes under the first-year sea ice in Resolute Passage, Northwest Territories, Canada.

Shirasawa, K., Ingram, R.G., *Journal of marine systems*, Feb. 1997, 11(1-2), Canada-Japan SARES Project on First-Year Sea Ice. Proceedings. Edited by J.C. Therriault et al, p.21-32, 17 refs.

Oceanography, Sea ice, Fast ice, Subglacial observations, Heat flux, Turbulent exchange, Ice water interface, Ice cover effect, Friction, Tidal currents, Ice temperature, Mass transfer, Diurnal variations, Canada—Northwest Territories—Resolute Passage

51-3687

Tidally forced under-ice Ekman layers observed by an acoustic Doppler current profiler.

Marsden, R.F., Ingram, R.G., Milinazzo, F., Buckley, A.G., Stacey, M.W., *Journal of marine systems*, Feb. 1997, 11(1-2), Canada-Japan SARES Project on First-Year Sea Ice. Proceedings. Edited by J.C. Therriault et al, p.33-43, 20 refs.

Oceanography, Tidal currents, Fast ice, Viscosity, Ice water interface, Turbulent diffusion, Subglacial observations, Underwater acoustics, Profiles, Water pressure, Fluid dynamics, Mathematical models

51-3688

Effect of silicate enrichment on ice algae at low salinity in Saroma-ko Lagoon, Hokkaido, Japan.

Taguchi, S., Smith, R.E.H., Shirasawa, K., *Journal of marine systems*, Feb. 1997, 11(1-2), Canada-Japan SARES Project on First-Year Sea Ice. Proceedings. Edited by J.C. Therriault et al, p.45-52, 31 refs.

Marine biology, Biomass, Algae, Plant ecology, Ice bottom surface, Ice melting, Ice cover effect, Nutrient cycle, Salinity, Brines, Turbulent diffusion, Chlorophylls, Photosynthesis, Japan—Saroma-ko Lagoon

51-3689

Effect of nitrogen and silicate enrichment on photosynthate allocation by ice algae from Resolute Passage, Canadian Arctic.

Taguchi, S., Smith, R.E.H., *Journal of marine systems*, Feb. 1997, 11(1-2), Canada-Japan SARES Project on First-Year Sea Ice. Proceedings. Edited by J.C. Therriault et al, p.53-61, 45 refs.

Marine biology, Plant ecology, Algae, Ice bottom surface, Nutrient cycle, Biomass, Photosynthesis, Ice cover effect, Growth, Sampling, Canada—Northwest Territories—Resolute Passage

51-3690

Influence of major inorganic nutrients on the growth and physiology of high arctic ice algae.

Smith, R.E.H., Gosselin, M., Taguchi, S., *Journal of marine systems*, Feb. 1997, 11(1-2), Canada-Japan SARES Project on First-Year Sea Ice. Proceedings. Edited by J.C. Therriault et al, p.63-70, 19 refs.

Marine biology, Plant ecology, Algae, Sea ice, Ice bottom surface, Ice water interface, Biomass, Nutrient cycle, Degradation, Photosynthesis, Growth, Sampling, Simulation, Ice cover effect, Canada—Northwest Territories—Resolute Passage

51-3691

DOC and its relationship to algae in bottom ice communities.

Smith, R.E.H., Gosselin, M., Kudoh, S., Robineau, B., Taguchi, S., *Journal of marine systems,* Feb. 1997, 11(1-2), Canada-Japan SARES Project on First-Year Sea Ice. Proceedings. Edited by J.C. Therriault et al, p.71-80, 36 refs.

Marine biology, Plant ecology, Algae, Sea ice, Ice bottom surface, Ice water interface, Snowmelt, Biomass, Nutrient cycle, Suspended sediments, Solubility, Organic nuclei, Ice cores, Sampling

51-3692

Horizontal heterogeneity of microalgal biomass in the first-year sea ice of Saroma-ko Lagoon, (Hokkaido, Japan).

Robineau, B., Legendre, L., Kishino, M., Kudoh, S., *Journal of marine systems,* Feb. 1997, 11(1-2), Canada-Japan SARES Project on First-Year Sea Ice. Proceedings. Edited by J.C. Therriault et al, p.81-91, 37 refs.

Marine biology, Algae, Microbiology, Ice bottom surface, Young ice, Ice water interface, Ice cover thickness, Salinity, Biomass, Distribution, Sampling, Radiance, Snow cover effect, Japan—Saroma-ko Lagoon

51-3693

Photosynthetic acclimation and the estimation of temperate ice algal primary production in Saroma-ko Lagoon, Japan.

Kudoh, S., Robineau, B., Suzuki, Y., Fujiyoshi, Y., Takahashi, M., *Journal of marine systems,* Feb. 1997, 11(1-2), Canada-Japan SARES Project on First-Year Sea Ice. Proceedings. Edited by J.C. Therriault et al, p.93-109, 49 refs.

Marine biology, Sea ice, Young ice, Algae, Biomass, Ice bottom surface, Photosynthesis, Radiance, Acclimatization, Ice water interface, Ice cover effect, Ice growth, Sampling, Japan—Saroma-ko Lagoon

51-3694

Photosynthetic and respiratory characteristics of an arctic ice algal community living in low light and low temperature conditions.

Suzuki, Y., Kudoh, S., Takahashi, M., *Journal of marine systems,* Feb. 1997, 11(1-2), Canada-Japan SARES Project on First-Year Sea Ice. Proceedings. Edited by J.C. Therriault et al, p.111-121, 29 refs.

Marine biology, Plant physiology, Algae, Young ice, Ice bottom surface, Ice cover effect, Biomass, Seasonal variations, Photosynthesis, Radiance, Light effects, Sampling, Mathematical models, Arctic Ocean

51-3695

Temporal variation of chlorophyll-like pigment composition in sinking particles during the ice-covered season in Saroma-ko Lagoon.

Sakoh, H., Matsuda, O., Michel, C., Legendre, L., Rajendran, N., Yamamoto, T., *Journal of marine systems,* Feb. 1997, 11(1-2), Canada-Japan SARES Project on First-Year Sea Ice. Proceedings. Edited by J.C. Therriault et al, p.123-131, 40 refs.

Oceanography, Marine biology, Suspended sediments, Organic nuclei, Chlorophylls, Degradation, Distribution, Algae, Plankton, Nutrient cycle, Subglacial observations, Ice cover effect, Sampling, Japan—Saroma-ko Lagoon

51-3696

Coexistence of microalgal sedimentation and water column recycling in a seasonally ice-covered ecosystem (Saroma-ko Lagoon, Sea of Okhotsk, Japan).

Michel, C., Legendre, L., Taguchi, S., *Journal of marine systems,* Feb. 1997, 11(1-2), Canada-Japan SARES Project on First-Year Sea Ice. Proceedings. Edited by J.C. Therriault et al, p.133-148, Refs. p.145-148.

Marine biology, Sea ice, Geochemical cycles, Ecosystems, Nutrient cycle, Algae, Plankton, Ice bottom surface, Ice water interface, Ice melting, Suspended sediments, Sedimentation, Sampling, Ice cover effect, Seasonal variations, Japan—Hokkaido, Okhotsk Sea

51-3697

Ice-brine and planktonic microheterotrophs from Saroma-ko Lagoon, Hokkaido (Japan): quantitative importance and trophodynamics.

Sime-Ngando, T., Juniper, S.K., Demers, S., *Journal of marine systems,* Feb. 1997, 11(1-2), Canada-Japan SARES Project on First-Year Sea Ice. Proceedings. Edited by J.C. Therriault et al, p.149-161, 50 refs.

Marine biology, Ecosystems, Plankton, Algae, Biomass, Classifications, Ice bottom surface, Ice water interface, Brines, Snow cover effect, Sampling, Japan—Saroma-ko Lagoon

51-3698

Changes in sea-ice phagotrophic microprotists (20-200μm) during the spring algal bloom, Canadian Arctic Archipelago.

Sime-Ngando, T., Gosselin, M., Juniper, S.K., Levasseur, M., *Journal of marine systems,* Feb. 1997, 11(1-2), Canada-Japan SARES Project on First-Year Sea Ice. Proceedings. Edited by J.C. Therriault et al, p.163-172, 49 refs.

Marine biology, Microbiology, Bacteria, Plankton, Ecosystems, Biomass, Ice bottom surface, Ice water interface, Ice cover effect, Snow cover effect, Nutrient cycle, Ice cores, Sampling, Statistical analysis, Canada—Northwest Territories—Resolute Passage

51-3699

Carbon flows through the microbial food web of first-year ice in Resolute Passage, (Canadian High Arctic).

Vézina, A.F., Demers, S., Laurion, I., Sime-Ngando, T., Juniper, S.K., Devine, L., *Journal of marine systems,* Feb. 1997, 11(1-2), Canada-Japan SARES Project on First-Year Sea Ice. Proceedings. Edited by J.C. Therriault et al, p.173-189, Refs. p.187-189.

Marine biology, Biomass, Nutrient cycle, Suspended sediments, Solubility, Ice bottom surface, Ecosystems, Microbiology, Algae, Bacteria, Plankton, Sampling, Snow cover effect, Models, Canada—Northwest Territories—Resolute Passage

51-3700

Diel vertical migration and feeding rhythm of copepods under sea ice at Saroma-ko Lagoon.

Saito, H., Hattori, H., *Journal of marine systems,* Feb. 1997, 11(1-2), Canada-Japan SARES Project on First-Year Sea Ice. Proceedings. Edited by J.C. Therriault et al, p.191-203, 57 refs.

Marine biology, Algae, Plankton, Ice bottom surface, Biomass, Nutrient cycle, Migration, Ice cover effect, Light effects, Diurnal variations, Sampling, Japan—Saroma-ko Lagoon

51-3701

Diel changes in vertical distribution and feeding activity of copepods in ice-covered Resolute Passage, Canadian Arctic, in spring 1992.

Hattori, H., Saito, H., *Journal of marine systems,* Feb. 1997, 11(1-2), Canada-Japan SARES Project on First-Year Sea Ice. Proceedings. Edited by J.C. Therriault et al, p.205-219, Refs. p.217-219.

Marine biology, Ecosystems, Microbiology, Biomass, Algae, Distribution, Nutrient cycle, Diurnal variations, Sea ice, Ice bottom surface, Ice water interface, Ice cover effect, Ice melting, Sampling, Statistical analysis, Canada—Northwest Territories—Resolute Passage

51-3702

Transport of marine fish larvae to Saroma-ko Lagoon (Hokkaido, Japan) in relation to the availability of zooplankton prey under the winter ice cover.

Fortier, M., Fortier, L., *Journal of marine systems,* Feb. 1997, 11(1-2), Canada-Japan SARES Project on First-Year Sea Ice. Proceedings. Edited by J.C. Therriault et al, p.221-234, Refs. p.232-234.

Marine biology, Ecosystems, Biomass, Migration, Tidal currents, Sea ice, Ice bottom surface, Algae, Nutrient cycle, Ice cover effect, Seasonal variations, Sampling, Survival, Japan—Hokkaido, Okhotsk Sea

51-3703

Holocene glacial and climatic variations on Spitsbergen, Svalbard.

Svendsen, J.I., Mangerud, J., *Holocene,* Mar. 1997, 7(1), p.45-57, Refs. p.56-57.

Glacial geology, Climatic changes, Subpolar regions, Glacier oscillation, Glacier melting, Lacustrine deposits, Quaternary deposits, Moraines, Glaciation, Sedimentation, Drill core analysis, Correlation, Radioactive age determination, Geochronology, Norway—Svalbard

51-3704

Interpretation of the glacio-lacustrine record in northern Sweden: a comment on Snowball and Sandgren.

Karlén, W., Snowball, I.F., Sandgren, P., *Holocene,* Mar. 1997, 7(1), p.119-120, Includes reply. 16 refs. For pertinent paper see 51-1133.

Glacial geology, Glacial deposits, Glacier oscillation, Lacustrine deposits, Sedimentation, Particle size distribution, Drill core analysis, Radioactive age determination, Accuracy, Sweden

51-3705

Reassessment of supposed early-'Little Ice Age' and older Neoglacial moraines in the Sandane area of western Norway: a reply to Matthews, Nesje and Dahl.

Evans, D.J.A., *Holocene,* Mar. 1997, 7(1), p.121-124, 8 refs. For pertinent paper see 49-663.

Glacial geology, Glacier oscillation, Glacial deposits, Moraines, Geomorphology, Lichens, Paleoecology, Lichens, Geochronology, Accuracy, Statistical analysis, Norway

51-3706

Empirical model of zonal water-vapor distribution in the arctic atmosphere.

Burova, L.P., *Russian meteorology and hydrology,* 1995, No.12, p.34-38, Translated from Meteorologiia i gidrologiia. 8 refs.

Climatology, Polar atmospheres, Atmospheric composition, Water vapor, Humidity, Distribution, Sampling, Seasonal variations, Statistical analysis

51-3707

Interannual temperature variability in wintertime polar stratosphere.

Sukharev, B.E., *Russian meteorology and hydrology,* 1995, No.12, p.39-48, Translated from Meteorologiia i gidrologiia. 28 refs.

Climatology, Global warming, Air temperature, Insolation, Polar atmospheres, Stratosphere, Atmospheric circulation, Seasonal variations, Statistical analysis, Correlation

51-3708

Precipitation, snowpack, stream-water ion chemistry, and flux in a northern Michigan watershed, 1982-1991.

Stottlemyer, R., Toczydlowski, D., *Canadian journal of fisheries and aquatic sciences,* Dec. 1996, 53(12), p.2659-2672, With French summary. Refs. p.2670-2672.

Watersheds, Mass balance, Streams, Hydrogeochemistry, Precipitation (meteorology), Snowmelt, Snow composition, Snow water equivalent, Impurities, Meltwater, Ion diffusion, Ion density (concentration), Seasonal variations, Hydrography, United States—Michigan

51-3709

Recent cooling and recession of Norway spruce (*Picea abies* (L.) Karst.) in the forest-alpine tundra ecotone of the Swedish Scandes.

Kullman, L., *Journal of biogeography,* Nov. 1996, 23(6), p.843-854, 71 refs.

Climatology, Climatic changes, Cooling, Forest canopy, Vegetation patterns, Growth, Desiccation, Subarctic landscapes, Tundra vegetation, Tundra climate, Forest lines, Sampling, Biogeography, Sweden

51-3710

Theoretical and laboratory studies on the interaction of cosmic-ray particles with interstellar ices. I. Synthesis of polycyclic aromatic hydrocarbons by a cosmic-ray-induced multicenter mechanism.

Kaiser, R.I., Roessler, K., *Astrophysical journal,* Jan. 20, 1997, 475(1)pt.1, p.144-154, 47 refs.

Extraterrestrial ice, Ice physics, Ice spectroscopy, Gamma irradiation, Hydrocarbons, Ionization, Radiation absorption, Molecular structure, Phase transformations, Spectra, Computerized simulation

51-3711

Analyses of the temporal variation of coarse bedload transport and its grain size distribution, Squaw Creek, Montana, USA.

Bunte, K., *U.S. Forest Service. Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO. General technical report,* Dec. 1996, RM-GTR-288, 123p., Refs. p.111-119. Translation of a Ph.D. thesis originally in German, submitted to the Freie Universität Berlin in Jan. 1991.

Snow hydrology, Snowmelt, Runoff, Stream flow, Sediment transport, Bottom sediment, Suspended sediments, Alluvium, Water erosion, Grain size, Particle size distribution, Statistical analysis, United States—Montana

51-3712

Propeller-ice interaction. Joint research project arrangement #6, (JRPA #6). Joint conclusion report.

Soininen, H., ed, Veitch, B., ed, *Finland. Technical Research Centre (Valtion teknillinen tutkimuskeskus). VTT research notes,* 1996, No.1762, 31p. + appends., 39 refs.

Ships, Propellers, Ice solid interface, Ice navigation, Metal ice friction, Ice loads, Hydrodynamics, Cavitation, Computerized simulation

51-3713

Thermodynamics of freezing soils: theory and application.

Sheng, D.C., Luleå, Sweden, University of Technology, 1994, 201p., Ph.D. thesis. With Swedish summary and Chinese preface. Refs. p.129-142 and passim in appends.

Soil freezing, Frozen ground thermodynamics, Frost heave, Frost penetration, Frost action, Thaw weakening, Ice lenses, Freezing front, Soil water migration, Mathematical models

51-3714

Measurements of hazardous icing conditions.

Politovich, M.K., International Conference on Aviation Weather Systems, 3rd, 1989. Preprints, Boston, American Meteorological Society, 1989, p.159-163, 8 refs.

Aircraft icing, Ice accretion, Ice loads, Ice detection, Ice forecasting, Weather forecasting, Safety

51-3715

Modeling creep and damage in polycrystalline ice.

Wu, M.S., Shyam Sunder, S., Cambridge, MA, Massachusetts Institute of Technology, [1990], 12p., Unpublished manuscript. 20 refs.

Ice cover strength, Ice microstructure, Ice crystal structure, Ice loads, Ice pressure, Ice elasticity, Ice deformation, Ice creep, Ice cracks, Crack propagation, Mathematical models

51-3716

Elastic anisotropy and micro-damage processes in polycrystalline ice. Part I: theoretical formulation.

Wu, M.S., Shyam Sunder, S., Cambridge, MA, Massachusetts Institute of Technology, [1990], 27p. + figs., Unpublished manuscript. 34 refs.

Ice cover strength, Ice microstructure, Ice crystal structure, Ice loads, Ice pressure, Ice elasticity, Ice deformation, Ice creep, Ice cracks, Crack propagation, Mathematical models

51-3717

Elastic anisotropy and micro-damage processes in polycrystalline ice. Part II: numerical simulations.

Wu, M.S., Shyam Sunder, S., Cambridge, MA, Massachusetts Institute of Technology, [1990], 23p. + figs., Unpublished manuscript. 26 refs.

Ice cover strength, Ice microstructure, Ice crystal structure, Ice loads, Ice pressure, Ice elasticity, Ice deformation, Ice creep, Ice cracks, Crack propagation, Mathematical models

51-3718

"Ancient atmosphere—validity of ice records" by Z. Jaworowski, ESPR 1(3), p.161-171, 1994.

Oeschger, H., *Environmental science and pollution research,* 1995, 2(1), p.60-61.

Ice cores, Ice composition, Ice dating, Atmospheric composition, Carbon dioxide, Paleoclimatology, Global warming

51-3719

DC resistivity and seismic refraction soundings on rock glacier permafrost in northwestern Svalbard.

Wagner, S., *Norsk geografisk tidsskrift,* 1996, Vol.50, p.25-36, 27 refs.

Rock glaciers, Periglacial processes, Permafrost surveys, Permafrost thickness, Permafrost structure, Seismic surveys, Electromagnetic prospecting, Geophysical surveys, Norway—Svalbard

51-3720

Drilling in alpine permafrost.

Vonder Mühll, D.S., *Norsk geografisk tidsskrift,* 1996, Vol.50, p.17-24, 15 refs.

Rock drilling, Borehole instruments, Drill core analysis, Rock glaciers, Permafrost surveys, Permafrost indicators, Permafrost thermal properties, Frozen ground temperature, Frozen rock temperature, Ground ice

51-3721

Abstracts.

Frozen Ground Workshop, Hanover, NH, Dec. 9-11, 1995: Our current understanding of processes and ability to detect change, Hallet, B., ed, Black, P.B., ed, MP 4026, Woods Hole, MA, International Permafrost Association, c/o Jerry Brown, P.O. Box 7, 46p., Abstracts only. Co-hosted by Dartmouth College and the U.S. Cold Regions Research and Engineering Laboratory.

Meetings, Research projects, Permafrost, Frozen ground, Soil freezing, Periglacial processes, Climatic changes

51-3722

Exploiting wind power in Antarctica.

Guichard, A., Magill, P., Godon, P., Lyons, D., Brown, C., Sandy Bay, Tasmania, Latitude Technologies, 1995, 15p., With French summary. 10 refs. Paper presented at the 1995 Conference of the Australian and New Zealand Solar Energy Society, "Solar'95", Hobart, Tasmania, Australia, Nov. 29-Dec. 1, 1995.

Stations, Electric power, Wind power generation, Wind velocity, Air temperature, Utilities, Cold weather performance

In the 1950s and 60s, the remote and inhospitable antarctic region saw the establishment of many scientific stations. These scientific stations require highly reliable continuous power to ensure both the continuity of scientific activities and a suitable level of comfort for the expeditioners. Engineers have always turned their minds to the use of renewable energy at the stations and, because of the high winds generally experienced, wind power was always felt to be the most promising solution. But the early expeditions encountered reliability problems with wind turbines and found that conventional generator sets and boilers were the only satisfactory, practical answer to the reliable provision of the energy required at the stations. Although continually improved, the present energy systems still rely on the same basic principles. In recent times, environmental and logistic concerns have provided an incentive for a move away from the reliance on imported fuels to using renewables. Preliminary studies conducted in the framework of a cooperative French-Australian Project have identified wind power as the most promising solution for immediate implementation at the two nations' stations. This paper outlines the wind characteristics at several stations, and after discussing the availability of suitable wind turbines, looks at the power generation potential of selected turbines at these stations.

51-3723

Potential for significant wind power generation at antarctic stations.

Guichard, A., Magill, P., Godon, P., Lyons, D., Brown, C., Sandy Bay, Tasmania, Latitude Technologies, 1996, 10p., With French summary. 14 refs. Paper presented at the 7th Symposium on Antarctic Logistics and Operations, Cambridge, England, Aug. 6-7, 1996.

Stations, Electric power, Wind power generation, Wind velocity, Air temperature, Utilities, Cold weather performance

The antarctic scientific stations are generally powered by conventional diesel boilers and generator sets which consume large amounts of fossil fuels. In addition to being difficult and expensive to ship, fuel can threaten the local environment. The potential for wind power generation is high, but few commercial wind turbines can resist the harsh local conditions. The 10 kW "UM70X/GEV7.10" turbine was identified as the most suitable unit currently available. Its production potential was assessed and used as a basis for analyzing several configurations of wind-diesel systems at the stations. At some stations where conditions have been found to be favorable, modest investments in wind turbines would make significant contributions to the overall station energy requirements, while larger, more ambitious systems could make the stations nearly independent of fossil fuels.

51-3724

Curing temperature, age and strength of concrete.

Bergström, S.G., *Magazine of concrete research,* Dec. 1953, 5(14), p.61-66, 9 refs.

Concrete curing, Concrete strength, Low temperature tests

51-3725

Analysis of aircraft take-off risks in icing conditions.

Biggs, D.C., Hamilton, G.B., Owen, K.D.J., *Transport Canada. Transportation Development Centre, Montreal. Publication,* Feb. 1994, TP 11683E, 60p. + appends., With French summary. 23 refs.

Aircraft icing, Ice loads, Chemical ice prevention, Ice forecasting, Weather forecasting, Safety, Computerized simulation, Statistical analysis

51-3726

Snow survey bulletin & water supply forecast, March 1, 1997, Yukon Territory.

Canada. Indian and Northern Affairs. Water Resources Division, Whitehorse, 1997, 27p.

Snow surveys, Runoff forecasting, Snow depth, Snow water equivalent, Stream flow, Canada—Yukon Territory

51-3727

Dynamic unloading across the face of a wide structure.

Kärnä, T., Järvinen, E., IAHR International Symposium on Ice, Trondheim, Norway, Aug. 23-26, 1994. IAHR Working Group on Ice Forces on Structures. Special report, Trondheim, Norwegian Institute of Technology, 1994, p.D1-D22, 42 refs. Presented at the technical session on Experience of Arctic Offshore Structures.

Offshore structures, Ice solid interface, Ice loads, Ice pressure, Ice friction, Ice cover strength, Ice elasticity, Ice deformation, Ice breaking, Ice relaxation, Mathematical models

51-3728

Molikpaq ice interactions: predicted and actual performance.

Hewitt, K.J., IAHR International Symposium on Ice, Trondheim, Norway, Aug. 23-26, 1994. IAHR Working Group on Ice Forces on Structures. Special report, Trondheim, Norwegian Institute of Technology, 1994, p.E1-E14, 14 refs. Presented at the technical session on Experience of Arctic Offshore Structures. Includes discussion by G. Pidcock, B. Rogers, and B. Wright, and author's reply.

Offshore structures, Artificial islands, Caissons, Ice solid interface, Ice loads, Ice pressure, Design criteria

51-3729

Hans Island revisited.

Metge, M., IAHR International Symposium on Ice, Trondheim, Norway, Aug. 23-26, 1994. IAHR Working Group on Ice Forces on Structures. Special report, Trondheim, Norwegian Institute of Technology, 1994, p.J1-J15, 16 refs. Presented at the technical session on Experience of Arctic Offshore Structures.

Offshore landforms, Ice floes, Ice loads, Ice pressure, Ice friction, Ice pileup, Grounded ice, Drift, Canada—Northwest Territories—Kennedy Channel

51-3730

Ice edge failure and local ice-structure contact.

Tuhkuri, J., Integrated numerical and experimental methods in ship design, Espoo, Finland, Mar. 27, 1996. VTT symposium 168. Edited by A. Rantanen, Espoo, Finland, Technical Research Centre (Valtion teknillinen tutkimuskeskus), 1996, p.10-20, 17 refs.

Ships, Offshore structures, Ice solid interface, Ice loads, Ice friction, Ice pressure, Ice deformation, Ice breaking

51-3731

New propeller ice load models.

Koskinen, P., Soininen, H., Jussila, M., Integrated numerical and experimental methods in ship design, Espoo, Finland, Mar. 27, 1996. VTT symposium 168. Edited by A. Rantanen, Espoo, Finland, Technical Research Centre (Valtion teknillinen tutkimuskeskus), 1996, p.21-34, 6 refs.

Ships, Propellers, Ice solid interface, Ice loads, Metal ice friction, Ice breaking, Ice navigation, Design criteria

51-3732

Assessing ship operability in ice.

Nyman, T., Integrated numerical and experimental methods in ship design, Espoo, Finland, Mar. 27, 1996. VTT symposium 168. Edited by A. Rantanen, Espoo, Finland, Technical Research Centre (Valtion teknillinen tutkimuskeskus), 1996, p.35-49, 25 refs.

Ships, Ice solid interface, Ice loads, Metal ice friction, Ice pressure, Ice navigation, Ice routing, Computerized simulation

51-3733

Environmental impact assessment—a natural part of maritime operations.

Rytkönen, J., Integrated numerical and experimental methods in ship design, Espoo, Finland, Mar. 27, 1996. VTT symposium 168. Edited by A. Rantanen, Espoo, Finland, Technical Research Centre (Valtion teknillinen tutkimuskeskus), 1996, p.50-68, 21 refs.

Ships, Marine transportation, Offshore drilling, Dredging, Accidents, Oil spills, Water pollution, Environmental impact, Environmental protection, Safety

51-3734

Some features of the formation of the ozonosphere over the Mirnyy observatory in 1989. [Nekotorye osobennosti formirovaniia ozonosfery nad observatorieĭ Mirnyĭ v 1989 g.]

Sakunov, G.G., Blium, E.M., *Rossiiskaia Antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'*, 1993, No.117, p.5-10, In Russian. 3 refs.

Ozone, Stratosphere, Air temperature, Antarctica—Queen Mary Coast

Stratospheric ozone in the 20-50 km layer was measured by the Mirnyy observatory using balloon sondes and radiophysical methods. An analysis of the observational data is presented, showing the characteristics of the changes over time of some of the atmospheric components being studied. A close link was found between the variation in the amount of ozone and the air temperature at various layers, with a maximum amplitude of variation during the spring recovery of the thermobarometric field at a height of 15-30 km. The "ozone hole" can be said to have finally closed on 27th November. Data on the monthly total ozone content, the monthly characteristics of stratospheric ozone, the correlation coefficient between the amount of ozone and the temperature, and the average daily total ozone are presented in tables, and the vertical profiles of ozone and air temperature are presented in figures.

51-3735

Characteristics of the long period variation in the spectral amplitude of the 500 millibar level in the troposphere above the southern hemisphere, and the possibility of using it for monthly meteorological forecasting in Antarctica. [O kharaktere dolgoperiodnykh kolebaniĭ spektral'nykh amplitud geopotentsiala H_{500} v troposfere iuzhnogo polushariia i vozmozhnost' ikh ispol'zovaniia dlia meteorologicheskogo prognoza v Antarktike na mesiats]

Evseev, M.P., *Rossiiskaia Antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'*, 1993, No.117, p.10-17, In Russian. 5 refs.

Meteorology, Synoptic meteorology, Atmospheric pressure, Weather forecasting, Long range forecasting, Atmospheric disturbances, Antarctica

The author presents data on a number of events arising from the 30-to-40-day variation in the spectral oscillation mode of the 500 millibar level, including the characteristic amplitude and dispersion from the general oscillation spectra (as a percentage variation) over the period 1981-1984. The results of a harmonic analysis of the daily most significant spectral mode of the 500 millibar level over the Southern Hemisphere for 1980-1981 are also given. A calculation of the amplitude and phase of the "significant" 30-to-45-day variation provides an indication of the predominant (cyclonic or anticyclonic) field and of the wind regime in various sectors of the Antarctic. The monthly calculation of such indicators in advance could be of great help in the planning and organization of long-term work in high latitudes.

51-3736

Transparency of the atmosphere over the Bunger Oasis. [Prozrachnost' atmosfery nad oazisom Bangera]

Sakunov, G.G., Blium, E.M., Savitskiĭ, G.B., *Rossiiskaia Antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'*, 1993, No.117, p.17-21, In Russian. 10 refs.

Meteorology, Atmospheric composition, Aerosols, Transparence, Insolation, Wind direction, Air masses, Antarctica—Wilkes Land, Antarctica—Queen Mary Coast, Antarctica—Bunger Hills, Antarctica—Mirnyy Station

Measurements of the spectral aerosol optical density and the atmospheric moisture content were carried out over the Soviet station at Bunger Oasis between 9th February and 4th March 1990, in order to investigate the reason for the apparent transparency of the atmosphere in the immediate vicinity. Results indicated that the greater transparency is probably caused by a decrease in aerosols due to the difference in climatic conditions between the observatory at Mirnyy Station, which is frequently subjected to the advection of air masses from the ocean, and Bunger, where the prevailing air originates from the antarctic land mass, and which is also further from the coast. Comparative data on the integral coefficient of transparency are given for Bunger and Mirnyy stations, as are the average values for the optical aerosol thickness of the atmosphere, and the resulting decrease in solar radiation.

51-3737

Possibility of using satellite data on cloud conditions in the analysis of areas of atmospheric pressure in Antarctica. [Vozmozhnost' ispol'zovaniia sputnikovykh dannykh ob oblachnosti v analize poleĭ atmosfernogo davleniia v Antarktike]

Lutsenko, E.I., *Rossiiskaia Antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'*, 1993, No.117, p.21-26, In Russian. 5 refs.

Meteorology, Marine meteorology, Spacecraft, Spaceborne photography, Atmospheric disturbances, Atmospheric pressure, Wind, Weather forecasting, Cloud cover, —South Pacific Ocean

Photomontages of satellite data on cloud conditions between 1970 and 1990 can be used to improve the analysis of pressure areas and winds in high southern latitudes. The various types of cyclonic cloud vortex are classified as either young, developed, occluded, or old cyclonic, and the pressure at the center of a cyclonic vortex can be predicted from its type and its dimensions. Trials have shown that winds in the ocean boundary layer can be predicted using satellite images of cloud cover, and the method is useful in calculating winds and pressure areas in the southern Pacific Ocean.

51-3738

Investigation of the energetics of active cyclones of the Southern Hemisphere using data from more frequent atmospheric soundings. [Issledovaniia energetiki aktivnykh tsiklonov iuzhnogo polushariia po materialam uchashchennogo zondirovaniia atmosfery]

Sobolev, S.N., Lutsenko, E.I., *Rossiiskaia Antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'*, 1993, No.117, p.26-34, In Russian. 7 refs.

Meteorology, Marine meteorology, Weather forecasting, Atmospheric disturbances, Atmospheric pressure, Wind

In order to improve the accuracy of weather forecasting in Antarctica, data from a special series of atmospheric soundings taken during the southern ocean cruise of *Professor Vize* are used to investigate the development of cyclones. The authors present calculations of the kinetic, potential, and internal energy volumetric densities of the early stages of cyclones, and traces changes in the energy balance over a 48-hour period. The results are compared with similar studies in the Northern Hemisphere.

51-3739

Measurement of the spectral transparency of the night-time atmosphere. [Izmerenie spektral'noĭ prozrachnosti atmosfery v nochnoe vremia]

Sakunov, G.G., Alekseeva, G.A., Anikin, S.P., *Rossiiskaia Antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'*, 1993, No.117, p.34-39, In Russian. 2 refs.

Atmospheric physics, Aerosols, Solar radiation, Antarctica—Queen Mary Coast

Radiation from known stars is useful in evaluating data on the optical properties of atmospheric aerosols. The author presents data from the Mirnyy observatory using the quasi-monochrome extra-atmospheric stream from several stars of different magnitudes. The spectral extinction coefficients for June 26, 1989, and the spectral motion of the extinction coefficient on June 21 when 5 values were obtained in the course of 5 hours, are also given. Values for the extinction coefficients in the spectral regions studied agree well with analogous parameters for sun photometry for the winter stratification of the atmosphere between Aug. and Oct. 1989.

51-3740

Main characteristics and typification of the processes of formation and growth of the Atlantic ice mass. [Osnovnye cherty i tipizatsiia protsessov formirovaniia i razvitiia Atlanticheskogo ledianogo massiva]

Kozlovskiĭ, A.M., *Rossiiskaia Antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'*, 1993, No.117, p.39-44, In Russian.

Sea ice, Sea ice distribution, Polynyas, Ice breakup, Ice edge, Ice growth, Ocean currents, Ice formation, Antarctica—Weddell Sea, —South Atlantic Ocean

The author discusses various aspects of the ice regime of the Weddell Sea and South Atlantic Ocean. Multi-year ice along the east coast of the Antarctic Peninsula is classified as accumulated sea ice with a cohesion factor of 7 and above. Changes in the speed and extent of the breakup of the ice in spring and early summer are indicators of seasonal changes in the ice regime of the Weddell Sea. The thinning of the ice which occurs between September and November known as the Weddell Sea polynya is thought to be associated with warmer deep water currents which melt the ice from below. The formation of the polynya, the melting of sea ice in the marginal ice zone due to the effects of atmospheric and ocean circulation along the eastern edge of the Weddell Sea, and the hydrodynamic processes taking place in the region of the Maud rise, all require further long-term study.

51-3741

Phenomenological diagram of the quasi-biennial cycle of variation in the ice cover of the southern ocean. [Fenomenologicheskaia skhema kvazidvukhletneĭ tsiklichnosti kolebaniĭ ledovitosti iuzhnogo okeana]

Romanov, A.A., Korotkov, A.I., *Rossiiskaia Antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'*, 1993, No.117, p.44-48, In Russian. 6 refs.

Sea ice distribution, Ice forecasting, Ice formation, Ice navigation, Ice conditions

The authors discuss the patterns of spatial and temporal variation and the interrelationships between oceanic and atmospheric processes which are fundamental to the mechanisms of evolution and decay in the sea ice zone of Antarctica. A diagram shows both direct and feedback relationships affecting ice cover in the southern ocean, including meridional atmospheric circulation, advection, thin ice zones and polynyas, and the main breakup areas. Inter-annual variation is seen as a universal mechanism affecting ice cover in both the Arctic and Antarctic, the main difference between the poles being the increased frequency with which the phenomenon occurs in the Antarctic within a varying biennial cycle. The diagram facilitates forecasting of ice conditions for navigation, the likely growth rate of stationary polynyas, and the time at which a new cycle of ice accumulation will commence.

51-3742

Formation and variability of Antarctic sea-ice as components of the polar climatic system. [Formirovanie i izmenchivost' morskikh Antarkticheskikh l'dov kak sostavnoĭ chasti poliarnoĭ klimaticheskoĭ sistemy]

Romanov, A.A., Korotkov, A.I., *Rossiiskaia Antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'*, 1993, No.117, p.48-54, In Russian. 27 refs.

Sea ice distribution, Ice forecasting, Antarctica

The authors discuss recent progress in the understanding of the complex variables and feedback mechanisms affecting the sea ice regime in the southern ocean, which has resulted in a more holistic view replacing the traditional hierarchical approach to the subject. They suggest that statistical methods of ice forecasting could be used to supplement traditional methods which are heavily reliant on data which can be difficult to obtain.

51-3743

Principal results of ice observation on the WWGS-89 expedition on the NES *Akademik Fedorov*. [Osnovnye rezul'taty ledovykh nabliudeniĭ v ekspeditsii *WWGS*-89 na NES "Akademik Fedorov"]

Romanov, A.A., Korotkov, A.I., Churun, V.N., *Rossiiskaia Antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'*, 1993, No.117, p.54-58, In Russian. 7 refs.

Sea ice, Ice salinity, Ice temperature, Ice cover thickness, Drift, Antarctica—Weddell Sea

The main results of an international expedition to investigate the winter conditions in the Weddell gyre in September and October are summarized. These include details of the thickness, temperature and salinity of the ice and snow cover. Figures show the advection of ice in the Weddell gyre and the changes in average daily values for air temperature, ice temperature, the temperature of the water immediately below the ice, and the salinity of the ice in an area selected for testing from Oct. 8-16, 1989.

51-3744

Problems of investigating sea level in Antarctica. [Problemy issledovaniia urovnia moria v Antarktike]

Kaliazin, V.E., *Rossiiskaia Antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'*, 1993, No.117, p.58-61, In Russian. 4 refs.

Oceanography, Sea level, Antarctica

The author describes the problems associated with obtaining data on sea-level changes from the waters around Antarctica, and discusses current efforts to improve the collection of data necessary for the study of global climate change. The years for which data is available for various Soviet research stations, mainly in the 1960s, are listed.

51-3745

Experimental determination by remote radiometry of the density of snow cover on a runway for heavy aircraft with wheeled landing gear in the vicinity of the Molodezhnaya AMC (Antarctic Meteorological Centre). [Eksperimental'noe opredelenie plotnosti snezhnogo pokrytia VPP dlia tiazhelykh samoletov s kolesnym shassi AMTs Molodezhnaia distantsionnym radiometricheskim metodom]

Galkin, S.I., Tarabukin, I.A., Gun, S.E., Nazarov, V.D., *Rossiiskaia Antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'*, 1993, No.117, p.61-68, In Russian. 5 refs.

Aircraft landing areas, Runways, Snow density, Snow temperature, Antarctica—Enderby Land, Antarctica—Molodezhnaya Station

The authors describe a method of measuring the density of snow cover on a runway, developed during the 1988-89 field season at a site in Enderby Land 12 km from the Soviet station at Molodezhnaya. Radiometric observations were carried out at temperatures from 0 to -30°C on all sections of the runway during its preparation and use. Details of radiothermal measurements, calculations and interpretation of the results are given.

51-3746

Review of experimental investigations on the construction of an artificial ice mooring in the region of Molodezhnaya AMC (Antarctic Meteorological Centre). [Obzor eksperimental'nykh issledovaniĭ po sozdaniiu iskusstvennogo ledianogo prichala v raĭone AMTs Molodezhnaia]

Potapenko, V.IU., Savatiugin, L.M., *Rossiiskaia Antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'*, 1993, No.117, p.68-72, In Russian.

Ice wharves, Ice (construction material), Antarctica—Molodezhnaya Station

This review covers practical investigations carried out between 1984 and 1990. The main findings were as follows: fresh water produces ice of higher density and freezes faster than salt water; blocks of ready cut sea ice can be frozen into position with fresh water; ice should be frozen in layers, as at temperatures over -20°C other methods do not give sufficient density; surfaces above the waterline need thermo-friction protection, and the area around the mooring must be capable of carrying transport vehicles. By combining these methods, an ice mooring was successfully built for the *Akademik Fedorov* in 1990.

51-3747

Predicting the thermophysical condition of an ice mooring near the Molodezhnaya AMC (Antarctic Meteorological Centre). [Prognoz teplofizicheskogo sostoianiia ledianogo prichala v raĭone AMTs Molodezhnaia]

Potapenko, V.IU., Savatiugin, L.M., Chekhovskikh, A.L., *Rossiiskaia Antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'*, 1993, No.117, p.72-79, In Russian. 2 refs.

Ice wharves, Ice (construction material), Ice refrigeration, Ice temperature, Antarctica—Molodezhnaya Station

The formula is given for calculating the temperature field of an ice mooring by means of a linear differential equalization of heat conductivity which can be used in predicting the temperature field during the critical warm months. The authors recommend the following measures to increase the life of ice moorings: Thermal insulation of the walls from the effects of sea water should be installed during first construction; the upper surfaces should be insulated at the end of winter by covering them with hydro-insulating film; and two rows of refrigerating columns should be inserted vertically along the walls of the ice mooring. Figures show the recommended position of refrigerating columns, and the temperature field of the walls of a thermally insulated ice mooring in summer.

51-3748

Theoretical possibility of remote radiometric determination of the density of snow cover. [Printsipial'nye vozmozhnosti distantsionnogo radiometricheskogo opredeleniia plotnosti snezhnykh pokrytiĭ]

Nazarov, V.D., Tarabukin, I.A., *Rossiiskaia Antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'*, 1993, No.117, p.79-83, In Russian. 2 refs.

Snow density, Ice runways, Radiometry, Antarctica

The authors describe the method and calculations required for remote radiometric determination of the density of snow cover, in the context of assessing the condition of landing strips in Antarctica.

51-3749

Principal features of the Antarctic malacofauna (as exemplified by the probranchial gastropods and bivalve molluscs). [Osnovnye cherty Antarkticheskoĭ malakofauny (na primere perednizhabernykh briukhonogikh i dvustvorchatykh molliuskov)]

Egorova, E.N., *Rossiiskaia Antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'*, 1993, No.117, p.83-87, In Russian.

Marine biology, Ecosystems, Biomass, Distribution, Classifications, Sampling, Antarctica

The author describes the basic characteristics of the malacological fauna of the inshore waters of Antarctica, including twelve new species, five new genera, and one new family. The generic composition of probranchial gastropods and bivalve molluscs is also described at the species level, with notes on size and vertical distribution down to 1,000 m. The role of molluscs in the food web and the use of their shells both as camouflage and substratum are also considered.

51-3750

New and little known species of Bryozoa (*Bryozoa: Cheilostomata*) from the Antarctic. [Novye i maloizvestnye vidy mshanok (*Bryozoa: Cheilostomata*) iz Antarktiki]

Gontar', V.I., *Rossiiskaia Antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'*, 1993, No.117, p.88-92, In Russian. 4 refs.

Marine biology, Ecosystems, Classifications, Structural analysis, Antarctica

The author describes *Arachnopusia decipiens* Hayward and Thorpe, *Porella andrejasheve* Gontar n.sp., and *Microporella delta parasimilis* Morris. Diagrams and tables are used to compare the parameters of the arctic zooid *Microporella ciliata* (Pallas) with those of *Microporelladeltaparasimilis* Morris from Antarctica.

51-3751

Periodic calving from the West Ice Shelf. [Ocherednoĭ otkol Zapadnogo shel'fovogo lednika]

Korotkov, A.I., Podmorin, V.G., Ponomarev, V.A., *Rossiiskaia Antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'*, 1993, No.117, p.98, In Russian.

Icebergs, Calving, Ice shelves, Antarctica—West Ice Shelf, Antarctica—Wilhelm II Coast

The authors report briefly on the calving in 1991 of an iceberg over 4,000 kmT2 in area from the northwestern edge of the West Ice Shelf on Wilhelm II Coast, Antarctica.

51-3752

Proceedings. Merging of theory and practice.

International Snow Science Workshop, Snowbird, UT, Oct. 31-Nov. 4, 1994, Snowbird, 1994, 679p., Refs. passim. For individual papers see 51-3753 through 51-3811.

Meetings, Safety, Avalanche modeling, Explosion effects, Snow cover stability, Avalanche triggering, Avalanche forecasting, Avalanche mechanics, Snow physics, Simulation, Mechanical tests, Statistical analysis

51-3753

Effective medium approximations for snow thermal and AC electrical conductivities.

Arons, E.M., Colbeck, S.C., McGilvary, W.R., Petrenko, V.F., MP 4027, International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.1, Abstract only included.

Snow physics, Snow thermal properties, Snow electrical properties, Electrical resistivity, Thermal conductivity, Models, Microstructure

The goal of this research was to develop a physical model to explain how the thermal and AC electrical conductivities of snow are affected by fundamental geometric attributes of its microstructure. Existing models require geometric simplifications that are so dramatic that they are unable to be directly linked to observable characteristics of snow and thus can not be used as predictors or be validated experimentally. Furthermore, these geometric simplifications are too extreme to permit the modeling of changes in thermal conductivity that arise from snow metamorphism. This paper introduces an effective medium approximation from random resistance network theory and showed that it can be used to identify precisely the real geometric quantities that determine thermal and AC electrical conductivities and to model changes in conductivity that occur in nature. The authors developed an apparatus to measure the thermal and AC electrical conductivities of snow and used it to show that the effective medium approximation gives useful predictions of those conductivities. It is concluded that effective medium theory explains the relationship between snow microstructure and conductivity. It provides an essential link between observable characteristics of snow and the theoretical understanding of physical processes that occur in this material.

51-3754

Observations of sun crust formation.

Ozeki, T., Akitaya, E., Suzuki, K., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.2-13, 6 refs.

Snow physics, Snow cover structure, Snow surface, Metamorphism (snow), Glaze, Solar radiation, Radiation absorption, Heat balance, Ice melting, Regelation, Snow air interface, Ice heat flux, Isotope analysis, Snow crust

51-3755

Monitoring a shear frame stability index and skier-triggered slab avalanches involving persistent snowpack weaknesses.

Jamieson, B., Johnston, C., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.14-21, 8 refs.

Avalanche triggering, Avalanche forecasting, Snow cover stability, Skis, Ice solid interface, Penetration tests, Shear strength, Shear stress, Indexes (ratios), Avalanche forecasting, Safety

51-3756

Avalanche forecasting program based on a modified nearest neighbour method.

Kristensen, K., Larsson, C., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.22-30, 7 refs.

Avalanche forecasting, Data processing, Computer programs, Meteorological factors, Weather forecasting, Statistical analysis, Correlation

51-3757

Determining the equivalent explosive effect for different explosives.

Johnson, J.B., MP 4028, International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.31-39, 7 refs.

Avalanche triggering, Explosives, Explosion effects, Mechanical properties, Detonation waves, Velocity

Explosives with different amounts of available chemical energy per unit mass (specific energy) have the same explosive effect when the total available chemical energy (detonation energy) for the explosives are equivalent. The effectiveness of a low detonation speed explosive will be similar to that of a high detonation speed explosive when their total detonation energies are the same. The perception that high detonation speed explosives are more effective than low detonation speed explosives at causing snow avalanche failure is a result of comparing explosives with equivalent mass rather that equivalent total energy and the fact that the Chapman-Jouguet pressure of an explosive is strongly dependent on detonation speed.

51-3758

Weather and snowpack conditions essential to slushflow release and downslope propagation.

Hestnes, E., Bakkehøi, S., Sandersen, F., Andresen, L., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.40-57, 8 refs.

Avalanche mechanics, Snow slides, Snow hydrology, Snow cover stability, Meteorological factors, Slush, Wet snow, Snowmelt, Water supply, Ice water interface, Avalanche forecasting, Mathematical models

51-3759

Country-wide avalanche warning in Switzerland.

Meister, R., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.58-71.

Avalanche protection, Safety, Warning systems, Accidents, Snow cover stability, Classifications

51-3760

Five Mountain Parks Highway Avalanche Study.

Stethem, C., Schaerer, P., Jamieson, B., Edworthy, J., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.72-79, 11 refs.

Roads, Avalanche protection, Avalanche forecasting, Avalanche triggering, Safety, Indexes (ratios), Warning systems, Cost analysis

51-3761

Allen residence, a mountain dream home destroyed by avalanches—an example of poor land-use planning, Sundance, Utah.

Giraud, R., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.80-90, 21 refs.

Houses, Avalanche forecasting, Damage, Safety, Urban planning, Standards, Avalanches, Accidents

51-3762

Using vegetative analysis to determine the extent and frequency of avalanches in Little Cottonwood Canyon, Utah.

Jenkins, M.J., Hebertson, E.G., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.91-103, 10 refs.

Avalanche forecasting, Avalanche mechanics, Avalanche tracks, History, Trees (plants), Damage, Plant tissues, Age determination, Periodic variations, Correlation

51-3763

I.S.S.W., past, present, and future.

Montagne, J., Schaerer, P., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.105-115, 16 refs.

Avalanche forecasting, Meetings, Organizations, Education, History

51-3764

Long-term observation of the water content of an alpine snowpack.

Fierz, C., Föhn, P.M.B., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.117-131, 22 refs.

Snow cover stability, Avalanche mechanics, Avalanche forecasting, Alpine landscapes, Snow hydrology, Snow surveys, Water content, Wet snow, Snowmelt, Runoff, Electrical measurement, Dielectric properties, Seepage

51-3765

Formation rate of surface hoar crystals under various wind velocities.

Hachikubo, A., Fukuzawa, T., Akitaya, E., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.132-137, 3 refs.

Snow cover stability, Avalanche mechanics, Hoarfrost, Snow cover structure, Snow surface, Snow crystal growth, Snow air interface, Wind velocity, Vapor pressure, Wind factors, Condensation, Mass transfer

51-3766

Variation of snow and winter air temperatures in the last 60 years at Shinjo, Japan.

Nakamura, T., Abe, O., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.138-155, 12 refs.

Climatology, Snow accumulation, Snow surveys, Seasonal variations, Snow depth, Air temperature, Temperature variations, Statistical analysis, Correlation, Avalanche forecasting, Japan—Shinjo

51-3767

Processing a high strength snow for South Pole compacted snow runway: test results from winter 1992-1993.

Lang, R.M., Blaisdell, G.L., D'Urso, C., Reinemer, G., Lesher, M., MP 4031, International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.156-175, 15 refs.

Runways, Snow roads, Snow (construction material), Snow compaction, Snow manufacturing, Bearing strength, Snow density, Hardness, Microstructure, Mechanical tests, Compressive properties, Snow vehicles, Antarctica—Amundsen-Scott Station

Field studies were required in order to identify the optimum snow processing technique that will produce a compact and bonded snow suitable for the construction of high strength snow roads and runways. Improving the strength of the snow runway at Amundsen-Scott Station would be required if the United States Antarctic Program considers wheeled aircraft as a possible delivery system. The types of conventional snow processing equipment that produces the highest snow strength were quantitatively verified using image analysis techniques and other on-site testing methods. Tests were performed in West Yellowstone, MT where the snow properties and winter ambient temperatures are as analogous as possible to those at Amundsen-Scott during the austral summer and in other arctic and antarctic regions. The processed snow was tested for hardness (strength) using a soil penetrometer, and strength values were correlated to bond density. The temperature distributions in the processed snow were monitored using a thermocouple stack and CR10 datalogger and are correlated to strength increases or decreases. Test results indicate that a powered tiller with a relatively dense tooth population provided the highest strength snow. (Auth. mod.)

51-3768

Effect of microstructure on heat and vapor transport in snow composed of uniform fine ice spheres.

Sato, A., Adams, E.E., Brown, R.L., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.176-184, 5 refs.

Metamorphism (snow), Snow cover structure, Microstructure, Ice vapor interface, Mass transfer, Thermal conductivity, Snow density, Grain size, Sintering, Mechanical tests, Models

51-3769

Database design for storage and retrieval of snow profiles on a PC.

Weir, P., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.185-196, 3 refs.

Snow cover structure, Geophysical surveys, Avalanche forecasting, Profiles, Meteorological factors, Layers, Classifications, Computer programs, Computerized simulation, Computer applications, Data processing, Imaging

51-3770

Measurements of the electric field gradient in a blizzard.

Schmidt, S., Dent, J., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.197-202, 10 refs.

Snowstorms, Blowing snow, Electric fields, Snow electrical properties, Static electricity, Mass transfer, Particles, Electrical measurement, Charge transfer, Probes, Polarization (charge separation)

51-3771

Toward the development of areal warning system of blowing snow.

Higashiura, M., Sato, T., Kimura, T., Maki, M., Iwanami, K., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.203-210, 2 refs.

Weather forecasting, Turbulent boundary layer, Falling snow, Snowdrifts, Blowing snow, Velocity measurement, Radar echoes, Warning systems, Meteorological instruments, Safety, Wind factors, Mountains

51-3772

Blowing snow and avalanches.

Guyomarc'h, G., Mérindol, L., Castelle, T., Sivardière, F., Buisson, L., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.211-221, 7 refs.

Snow physics, Avalanche forecasting, Blowing snow, Snow air interface, Turbulent boundary layer, Wind velocity, Snowdrifts, Snow erosion, Indexes (ratios), Photogrammetry, Topographic features, Computerized simulation

51-3773

Remote identification of precipitation type.

Ferguson, S.A., Breyfogle, S., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.222-259, 11 refs.

Precipitation (meteorology), Mountains, Falling snow, Avalanche forecasting, Detection, Classifications, Sensors, Remote sensing, Lasers, Safety, Computer programs

51-3774

Measurements and modeling of snow energy balance and sublimation from snow.

Tarboton, D.G., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.260-279, 12 refs.

Snow physics, Heat balance, Snow thermal properties, Snowmelt, Snow air interface, Turbulent exchange, Ablation, Seasonal variations, Snow water equivalent, Snow surface temperature, Correlation, Mathematical models, Simulation, Diurnal variations, Snow evaporation

51-3775

Streamlined collector for precipitation (ASCOP).

Wiesinger, T., Kroneis, W., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.280-283, 5 refs.

Precipitation (meteorology), Sensors, Snow accumulation, Precipitation gages, Design, Blowing snow, Orientation, Wind factors, Topographic effects, Accuracy, Countermeasures

51-3776

Application of classification and regression trees: selection of avalanche activity indices at Mammoth Mountain.

Davis, R.E., Elder, K., MP 4030, International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.285-294, 26 refs.

Avalanche forecasting, Avalanche modeling, Snow surveys, Snow courses, Classifications, Snow depth, Meteorological factors, Statistical analysis, Indexes (ratios), Accuracy, Correlation

This report emphasizes the importance of the parameters describing the degree of avalanche activity. Classification and regression trees were trained on weather, snow plot and avalanche occurrence observations from the Sierra Nevada, CA, a maritime influenced region. Avalanche activity was characterized by the total number of releases, the sum of the sizes and the maximum size class. The number of cases for the data set was 482. The accuracy of overall classification depended on which activity parameter was selected, while the ranking of the critical input variables remained identical. The probability of correct classification was the highest for the maximum size class, followed by the sum of the sizes, and the total number of releases.

51-3777

Two expert systems to forecast the avalanche hazard for a given region.

Schweizer, J., Föhn, P.M.B., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.295-309, 23 refs.

Avalanche forecasting, Snow cover stability, Classifications, Snow depth, Meteorological factors, Computer programs, Computerized simulation, Avalanche modeling, Performance, Accuracy, Data processing, Correlation

51-3778

Computer assistance in avalanche forecasting.

McClung, D.M., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.310-313, 4 refs.

Avalanche forecasting, Avalanche modeling, Snow cover structure, Computerized simulation, Computer programs, Mathematical models, Statistical analysis

51-3779

Relational database for snow avalanches.

Magnússon, M.M., Baldursdóttir, H.B., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.314-326, 7 refs.

Avalanche forecasting, Avalanche modeling, Avalanche tracks, Geophysical surveys, Classifications, Data processing, Computer programs, Imaging, Meteorological factors, History, Statistical analysis

51-3780

Use of neural networks in avalanche hazard forecasting.

Stephens, J., Adams, E., Huo, X., Dent, J., Hicks, J., McCarty, D., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.327-340, 10 refs.

Avalanche forecasting, Avalanche modeling, Snow cover stability, Meteorological factors, Computer programs, Computerized simulation, Data processing, Statistical analysis, Performance, Warning systems

51-3781

Statistical modelling of snow cover stability in mountain slopes.

Chernous, P.A., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.341-345, 6 refs.

Snow cover stability, Snow physics, Slope orientation, Avalanche forecasting, Avalanche modeling, Statistical analysis, Mathematical models, Correlation

51-3782

Velocity and mass transport measurements in a snow avalanche.

Dent, J.D., Adams, E.E., Bailey, I.J., Jazbutis, T.G., Schmidt, D.S., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.347-359, 2 refs.

Avalanche mechanics, Snow surveys, Mass transfer, Avalanche tracks, Snow cover structure, Velocity measurement, Profiles, Sensors, Infrared equipment, Topographic surveys

51-3783

Model for avalanches in three spatial dimensions: comparison of theory to experiments.

Lang, R.M., Leo, B.R., MP 4029, International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.360-384, 44 refs.

Snow physics, Fluid flow, Avalanche mechanics, Avalanche modeling, Avalanche tracks, Mass flow, Rheology, Ice friction, Phase transformations, Theories, Mathematical models

A three-dimensional theory is derived to describe the temporal behavior of gravity currents of cohesionless granular media, in an attempt to model the motion of dense, flow-type snow avalanches, ice and rock slides. A Mohr-Coulomb yield criterion is assumed to describe the constitutive behavior of the material, and the basal bed friction is described similarly by a Coulomb type of friction. Data from laboratory simulations are compared to a series of numerical studies based on the aforementioned theory. Two different numerical models are developed, tested and compared to experimental values. The results indicate that the model can account for flow transitions by inclusion of the drag term when the initial inclination angle is large enough to affect boundary drag. Furthermore, the temporal and spatial evolution of the granulate and final runout position can be predicted to values well within the experimental error.

51-3784

Observations of snow avalanches on dynamic internal structures at Alta, Utah.

Abe, O., Nakamura, T., Nohguchi, Y., Decker, R., Femenias, T., Howlett, D., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.385-392, 4 refs.

Avalanche mechanics, Snow cover structure, Avalanche tracks, Pipes (tubes), Pile structures, Impact tests, Pressure, Ice solid interface, Dynamic loads, Sensors, Velocity measurement

51-3785

Terrain parameters of avalanche starting zones and their effect on avalanche frequency.

Gleason, J.A., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.393-404, 17 refs.

Avalanche mechanics, Snow surveys, Avalanche triggering, Explosion effects, Topographic effects, Wind factors, Correlation, Statistical analysis, Periodic variations, History

51-3786

Correlation of fast rates of snow glide with full-depth avalanche occurrence.

Clarke, J.A., McClung, D.M., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.405-407, 4 refs.

Avalanche mechanics, Avalanche forecasting, Snow slides, Correlation, Velocity measurement, Seasonal variations

51-3787

Snow creep movement in the San Juan Mountain snowpack, Red Mountain Pass.

Walker, W., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.408-413, 2 refs.

Avalanche mechanics, Avalanche forecasting, Snow creep, Snow deformation, Snow cover stability, Correlation, Statistical analysis, Seasonal variations

51-3788

Understanding the avalanche beacon for best performance.

Lind, D.A., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.415-422, 3 refs.

Safety, Accidents, Avalanche protection, Rescue equipment, Radio beacons, Warning systems, Sensors, Radio waves, Wave propagation, Performance

51-3789

Snow avalanches in Provo Canyon, Utah.

Griffith, K., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.439-448, 1 ref.

Avalanche forecasting, Avalanche protection, Avalanche tracks, Logistics, Snow surveys, Safety, Roads, United States—Utah—Provo Canyon

51-3790

Avalanche warning and hazard zoning in Austria—some new aspects.

Höller, P., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.459-462, 7 refs.

Avalanches, Classifications, Avalanche forecasting, Warning systems, Standards, Organizations, Legislation, Safety, Environmental impact, Austria

51-3791

Local avalanche forecasting in Switzerland: strategy and tools. A new approach...

Bolognesi, R., Buser, O., Good, W., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.463-472, 9 refs.

Avalanche forecasting, Data processing, Computer programs, Avalanche modeling, Accuracy, Meteorological factors, Correlation, Safety, Switzerland

51-3792

Kinetic growth and associated weakening of the snowpack in the British Isles.

Blagbrough, S., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.503-508, 7 refs.

Snow physics, Avalanche mechanics, Snow cover stability, Avalanche triggering, Depth hoar, Avalanche mechanics, Vapor transfer, Ice vapor interface, Snow temperature, Temperature gradients

51-3793

Validations of objective models to simulate snow cover stratigraphy and avalanche risk for avalanche forecasting.

Giraud, G., Brun, E., Durand, Y., Martin, E., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.509-517, 10 refs.

Avalanche forecasting, Avalanche modeling, Snow cover structure, Snow stratigraphy, Meteorological factors, Safety, Snow depth, Snowmelt, Runoff, Simulation, Correlation

51-3794

Stuffblock: a simple and effective snowpack stability test.

Johnson, R., Birkeland, K., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.518-526, 17 refs.

Avalanche protection, Avalanche forecasting, Snow cover stability, Mechanical tests, Sampling, Shear strength, Snow strength, Dynamic loads, Simulation, Safety

51-3795

US Highway 550 Avalanche Reduction Project—San Juan Mountains of Colorado.

Bachman, D., Hogan, D., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.532-536, 4 refs. For another version see 49-941.

Avalanche protection, Avalanche forecasting, Safety, Avalanche tracks, Roads, Warning systems, Meteorological factors, Accuracy, United States—Colorado

51-3796

Road closure decision in Little Cottonwood Canyon.

Blattenberger, G., Fowles, R., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.537-547, 5 refs.

Safety, Roads, Avalanche protection, Avalanche forecasting, Avalanche modeling, Correlation, Statistical analysis, Accuracy, Models

51-3797

Avalanche hazard "Risk Management" for the Yule Marble Quarry.

Landry, C.C., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.548-563, 1 ref.

Avalanche protection, Avalanche forecasting, Quarries, Safety, Statistical analysis, Seasonal variations, Countermeasures, Meteorological factors

51-3798

French "Avalancheur".

Bérard, A.R.E., Borrel, G.R., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.565-574, 10 refs.

Avalanche protection, Avalanche triggering, Explosives, Chemical properties, Pipes (tubes), Design, Performance

51-3799

Avalanches: controlled triggering-off by radio beams.

Strand, M., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.575-579, 1 ref.

Avalanche protection, Avalanche triggering, Explosives, Radio waves, Detonation waves, Transmission, Instruments, Electronic equipment, Design

51-3800

GAZ-EX avalanche control system.

Schippers, J., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.580-582.

Avalanche protection, Avalanche triggering, Explosives, Liquefied gases, Explosion effects, Shock waves, Wave propagation, Towers

51-3801

"A bicycle built for two"—manually operated tramway for explosives delivery.

Gordon, C., Jorgensen, S., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.583-587.

Avalanche protection, Avalanche triggering, Explosives, Towers, Cables (ropes), Vehicles

51-3802

Role of bacterial protein for snowmaking and as an antifreeze.

Lind, D.A., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.589-600, 11 refs.

Snow manufacturing, Artificial snow, Ice crystal growth, Molecular structure, Bacteria, Antifreezes, Artificial nucleation, Heterogeneous nucleation, Hydraulic jets, Turbulent diffusion

51-3803

Use of RECCO system to locate buried roads in a winter environment.

Stanford, M., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.601-605.

Roads, Avalanche deposits, Detection, Microwaves, Radio waves, Electronic equipment, Reflectivity, Performance

51-3804

Modal analysis: a dynamic ski test.

Rice, B., Decker, R., Shorthill, R.W., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.606-616, 8 refs.

Skis, Mechanical properties, Vibration, Classifications, Mechanical tests, Computer programs, Surface roughness, Damage, Design, Damping, Resonance

51-3805

Sensitivity testing of handcharges and risk management in avalanche control.

Stethem, C., Canadian Explosives Research Laboratory, International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.617-625, 3 refs.

Avalanche protection, Avalanche triggering, Explosives, Portable equipment, Safety, Impact tests, Performance, Explosion effects

51-3806

Radial influence of the GAZ-EX on a continental snowpack—Glory Bowl slidepath, Teton Pass, Wyoming.

Elder, K., Newcomb, R., Canadian Explosives Research Laboratory, International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.626-635, 2 refs.

Avalanche protection, Avalanche triggering, Explosion effects, Explosives, Snow strength, Snow cover stability, Depth hoar, Performance

51-3807

Table tennis ball avalanche experiments.

Kosugi, K., et al, International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.636-642, 5 refs.

Avalanche mechanics, Avalanche modeling, Simulation, Mechanical tests, Slope processes, Imaging, Velocity measurement, Avalanche tracks

51-3808

Contributory factors to avalanche occurrence on Red Mountain Pass, San Juan Mountains, southwest Colorado.

Thompson, S., McCarty, D.K., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.645-656, 6 refs.

Avalanche forecasting, Meteorological factors, Snow depth, Snow water equivalent, Wind factors, Statistical analysis

51-3809

Slushflow disasters in Japan and its characteristics.

Kobayashi, S., Izumi, K., Kamiishi, I., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.657-665, 8 refs.

Avalanche mechanics, Avalanche forecasting, Slush, Saturation, Snow hydrology, Fluid dynamics, Viscosity, Impact strength, Shear rate, Mechanical tests, Accidents

51-3810

Liquid water distribution at the snow-soil interface.

Denoth, A., Eller, J., Gschnitzer, A., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.672-675, 3 refs.

Snow physics, Soil water, Wet snow, Profiles, Electrical measurement, Dielectric properties, Water content, Ice solid interface, Mechanical tests

51-3811

Microwave X-K-band measurements on snow—instrumentation and results.

Achammer, T., Giovanni, A., Denoth, A., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.676-679, 3 refs.

Snow physics, Snow electrical properties, Dielectric properties, Microwaves, Sensors, Water content, Wet snow, Attenuation, Metamorphism (snow)

51-3812

Belgian scientific research programme on the Antarctic. 1992-1996 research results summary.

Belgian State. Prime Minister's Services. Federal Office for Scientific, Technical and Cultural Affairs (OSTC), Brussels, May 1997, 30p., Refs. p.21-27.

Research projects, Climatic changes, Air ice water interaction, Glaciology, Sea ice, Oil spills, Marine biology, Environmental protection, Global change

This volume presents an overview of the results of the research projects funded under the Third Phase of the Belgian Scientific Research Programme on the Antarctic (1992-1996). The program comprises 7 research projects under 3 priority areas. They are: Ecodynamics of the Southern Ocean and Interactions with the Climate (biogeochemical fluxes and cycles in the main trophic compartments, modelling the global dynamics of ecosystems, assessment of the role of "new production" in the burial of atmospheric CO_2 by the southern ocean); Evolution and Protection of Marine Ecosystems (application of predictive ecological models to simulate ecosystem responses to man-made climatic disturbances, study of hydrocarbons spills dispersion); and Role of the Antarctic in Global Changes (ocean-cryosphere-atmosphere interactions, sedimentary palaeoenvironment).

51-3813

Description of ice cover in view of ice load calculation.

Englund, K., Kujala, P., Riska, K., *Helsinki University of Technology. Ship Laboratory. Report,* Aug. 1996, M-208, 61p., Refs. p.57-61.

Sea ice, Ice cover thickness, Ice mechanics, Ice loads, Ice conditions, Ships, Icebreakers, Ice navigation, Ice solid interface, Impact, Structural analysis, Mathematical models, Classifications, Statistical analysis, Forecasting

51-3814

Postrifting anelastic deformation around the spreading plate boundary, north Iceland. 1. Modeling of the 1987-1992 deformation field using a viscoelastic Earth structure.

Hofton, M.A., Foulger, G.R., *Journal of geophysical research,* Nov. 10, 1996, 101(B11), p.25,403-25,421, 46 refs.

Geological surveys, Geodetic surveys, Volcanoes, Earth crust, Subpolar regions, Tectonics, Magma, Geologic processes, Relaxation (mechanics), Viscoelasticity, Deformation, Models, Iceland

51-3815

Postrifting anelastic deformation around the spreading plate boundary, north Iceland. 2. Implications of the model derived from the 1987-1992 deformation field.

Hofton, M.A., Foulger, G.R., *Journal of geophysical research,* Nov. 10, 1996, 101(B11), p.25,423-25,436, 17 refs.

Tectonics, Volcanoes, Magma, Earth crust, Geodetic surveys, Fracture zones, Geologic processes, Deformation, Viscoelasticity, Subsidence, Forecasting, Models, Iceland

51-3816

Synoptic mechanisms associated with snowfall increases to the lee of Lakes Erie and Ontario.

Leathers, D.J., Ellis, A.W., *International journal of climatology,* Oct. 1996, 16(10), p.1117-1135, 40 refs.

Synoptic meteorology, Lake effects, Classifications, Climatology, Snowfall, Snow accumulation, Wind factors, Meteorological factors, Atmospheric circulation, Seasonal variations, Statistical analysis, Erie, Lake

51-3817

Speed on ice. [Heiß auf dem Eis]

Zimmerman, D., *Kunststoffe,* 1997, 87(1), p.79-82, In German with English summary.

Polymers, Composite materials, Sliding, Ice solid interface, Plastic properties, Manufacturing, Design, Plastics ice friction

51-3818

Estimating the uncertainty in spatial estimates of areal snow water equivalent.

Carroll, S.S., *Nordic hydrology,* 1996, 27(5), p.295-312, 15 refs.

Water supply, Snow hydrology, River basins, Runoff forecasting, Snow water equivalent, Mathematical models, Snow courses, Simulation, Correlation, Statistical analysis, Accuracy

51-3819

Mesoscale variability of the Upper Colorado River snowpack.

Ling, C.H., Josbeger, E.G., *Nordic hydrology,* 1996), 27(5), p.313-322, 4 refs.

River basins, Water supply, Snow hydrology, Snow accumulation, Snow water equivalent, Snow courses, Spaceborne photography, Correlation, Statistical analysis, Accuracy, United States—Colorado—Colorado River

51-3820

Nested Threshold Autoregressive (NeTAR) models for studying sources of nonlinearity in streamflows.

Astatkie, T., Watt, W.E., Watts, D.G., *Nordic hydrology,* 1996), 27(5), p.323-336, 8 refs.

Watersheds, Stream flow, Seasonal variations, Hydrography, Water storage, Snow hydrology, Runoff forecasting, Snowmelt, Meltwater, Air temperature, Mathematical models, Statistical analysis

51-3821

Potential role of vegetation feedback in the climate sensitivity of high-latitude regions: a case study at 6000 years B.P.

TEMPO (Testing Earth System Models with Paleo-Observations) Program, *Global biogeochemical cycles,* Dec. 1996, 10(4), p.727-736, Refs. p.734-736.

Climatology, Global warming, Global change, Greenhouse effect, Geochemical cycles, Carbon dioxide, Forest tundra, Tundra climate, Forest lines, Vegetation patterns, Vegetation factors, Albedo, Environmental impact, Simulation

51-3822

Liquid calcium chloride hard on ice, easy on corrosion. *Materials performance,* Sep. 1996, 35(9), p.49.

Road icing, Ice control, Salting, Solutions, Chemical ice prevention, Chemical properties, Specifications, Corrosion, Countermeasures, Environmental protection

51-3823

Method involving ice nucleation for the identification of microorganisms antagonistic to *Erwinia amylovora* on pear flowers.

Mercier, J., Lindow, S.E., *Phytopathology,* Sep. 1996, 86(9), p.940-945, 29 refs.

Plant physiology, Plant ecology, Plant tissues, Damage, Countermeasures, Microbiology, Bacteria, Fungi, Ice nuclei, Artificial nucleation, Simulation, Freezing points, Viability, Temperature effects

51-3824

Opening the Arctic: the drilling of Umiat #1.

Gerhard, L.C., *Northeastern geology and environmental sciences,* 1997, 19(1-2), p.8-13, 1 ref.

Petroleum industry, Drilling, Permafrost bases, Oil wells, History, Cold weather performance, Military operation, United States—Alaska

51-3825

Snowpack and runoff responses to climatic variability, southern Coastal Mountains, British Columbia.

Moore, R.D., *Northwest science,* Nov. 1996, 70(4), p.321-333, 22 refs.

Watersheds, Mountains, Snowfall, Snow hydrology, Snowmelt, Hydrography, Runoff, Snow water equivalent, Climatic changes, Atmospheric circulation, Seasonal variations, Correlation, Statistical analysis, Canada—British Columbia—Coastal Mountains

51-3826

Inlets, entrances and ice.

Bruun, P., *Journal of coastal research,* 1997, 13(1), p.233-235, 4 refs.

Shores, Ports, Offshore structures, Protection, Floating ice, Drift, Sands, Littoral zone, Sediment transport, Correlation

51-3827

Theoretical and simulation study of acoustic normal mode coupling effects due to the Barents Sea Polar Front, with application to acoustic tomography and matched-field processing.

Jin, G.L., Lynch, J.F., Chiu, C.S., Miller, J.H., *Acoustical Society of America. Journal,* July 1996, 100(1), p.193-205, 12 refs.

Oceanography, Underwater acoustics, Wave propagation, Ocean currents, Boundary layer, Sound waves, Wave propagation, Velocity measurement, Mathematical models, Profiles, Barents Sea

51-3828

Eccentric impact of an ice feature: linearized model.

Matskevitch, D.G., *Cold regions science and technology,* Apr. 1997, 25(3), p.159-171, 19 refs.

Ice solid interface, Offshore structures, Icebergs, Mechanical properties, Offshore structures, Impact strength, Orientation, Ice loads, Attenuation, Friction, Mathematical models, Design criteria

51-3829

Small-scale experiments on rime icing.

Makkonen, L., Oleskiw, M.M., *Cold regions science and technology,* Apr. 1997, 25(3), p.173-182, 21 refs.

Ice physics, Hoarfrost, Ice solid interface, Wind tunnels, Ice accretion, Ice loads, Antennas, Cables (ropes), Latticed structures, Experimentation, Models, Simulation

51-3830

Onset of river ice breakup.

Beltaos, S., *Cold regions science and technology,* Apr. 1997, 25(3), p.183-196, 37 refs.

River ice, Ice mechanics, Ice breakup, Cracking (fracturing), Forecasting, Ice jams, Ice water interface, Runoff, Classifications, Boundary value problems

51-3831

Laboratory calibration of TDR-probes for snow wetness measurements.

Lundberg, A., *Cold regions science and technology,* Apr. 1997, 25(3), p.197-205, 32 refs.

Avalanche protection, Avalanche forecasting, Snow hydrology, Snow physics, Ice water interface, Wet snow, Snow density, Unfrozen water content, Probes, Microwaves, Reflectivity, Velocity measurement, Dielectric properties, Design

51-3832

Introductory analysis of draining and freezing of de-icing fluids.

Tông, T.V.K., Louchez, P.R., Zouzou, A., *Cold regions science and technology,* Apr. 1997, 25(3), p.207-214, 6 refs.

Aircraft icing, Ground ice, Precipitation (meteorology), Rain, Supercooling, Ice accretion, Antifreezes, Drainage, Diffusion, Ice removal, Ice solid interface, Mathematical models

51-3833

Modified reversed direct-stress device.

LeClair, E.S., Davey, C., Dempsey, J.P., *Cold regions science and technology,* Apr. 1997, 25(3), p.215-224, 17 refs.

Sea ice, Salt ice, Ice strength, Tensile properties, Mechanical tests, Ice loads, Strains, Stress concentration, Measuring instruments, Design, Modification, Laboratory techniques, Performance

51-3834

On the formation of periodic arrays of icicles.

de Bruyn, J.R., *Cold regions science and technology,* Apr. 1997, 25(3), p.225-229, 16 refs.

Ice physics, Ice formation, Raindrops, Ice solid interface, Ice water interface, Icicles, Water films, Hydrodynamics, Fluid mechanics, Oscillations, Stability, Periodic variations, Theories, Analysis (mathematics)

51-3835

Overview of the SABER experiment for the TIMED mission.

Mlynczak, M.G., Russell, J.M., III, *Technical digest series,* 1995, Vol.2, Optical Remote Sensing of the Atmosphere. Topical Meeting, Salt Lake City, UT, Feb. 5-9, 1995. Postconference edition, p.5/MA2-1-MA2-3/7, 5 refs.

DLC QC871.O67 1995

Atmospheric composition, Meteorological instruments, Ozone, Data processing

The Sounding of the Atmosphere Using Broadband Emission Radiometry (SABER) experiment has been selected for flight on the Thermosphere-Ionosphere-Mesosphere Energetics and Dynamics (TIMED) mission expected to fly in the latter part of this decade. The primary science goal of SABER is to achieve fundamental and important advances in understanding of the energetics, chemistry, and dynamics, in the atmospheric region extending from 60 km to 180 km altitude, which has not been comprehensively observed on a global basis. These measurements will be used to infer atomic hydrogen and atomic oxygen, the latter inferred three different ways using only SABER observations. Measurements will be made both night and day over the latitude range from the southern to northern polar regions. (Auth. mod.)

51-3836

High resolution Interferometer Sounder - An accurate method for profile retrieval without the use of contemporary "first guess" data.

Smith, W.L., Huang, H.L., Ma, X.L., Woolf, H.M., Revercomb, H.E., *Technical digest series,* 1995, Vol.2, Optical Remote Sensing of the Atmosphere. Topical Meeting, Salt Lake City, UT, Feb. 5-9, 1995. Postconference edition, p.38/MD1-1-MD1-3/40.

DLC QC871.O67 1995

Atmospheric composition, Ozone, Air temperature, Simulation, Clouds (meteorology), Meteorological instruments, Infrared radiation

The High resolution Interferometer Sounder (HIS), is a Michelson interferometer which observes the spectrum of infrared radiation with a spectral resolution better than 2000/l. During 1994, the HIS flew aboard the NASA ER-2 during a series of flights between Christchurch, New Zealand and the antarctic ice shelf as part of the Airborne Southern Hemisphere Ozone Experiment (ASHOE). The intent of the HIS was to retrieve atmospheric profiles of temperature, water vapor, and ozone beneath the aircraft (20 Km) flight level. Because of the extensive cloudiness over the southern oceans, a method had to be able to provide accurate retrievals above clouds, regardless of their altitude or their opacity. This paper describes the

method developed for this application and provides results from the spectral radiance data obtained during the ASHOE to demonstrate their accuracy.

51-3837

Observations of polar ice using enhanced resolution microwave scatterometer data.

Long, D.G., *Technical digest series,* 1995, Vol.2, Optical Remote Sensing of the Atmosphere. Topical Meeting, Salt Lake City, UT, Feb. 5-9, 1995. Postconference edition, p.52/TuA1-1-TuA1-4/55, 5 refs.

DLC QC871.O67 1995

Imaging, Ice sheets, Image processing, Spaceborne photography, Radar, Simulation, Remote sensing, Seasonal variations, Sea ice distribution

Increasing interest in the role of ice sheets in regulating global climate has created a need for synoptic interannual recording and monitoring of the earth's major ice sheets. Based on their ability to "see" into ice, microwave remote sensing instruments are well-suited for monitoring the polar regions. In this paper an algorithm is applied to create enhanced resolution images from Seasat and ERS-1 scatterometer data over. Time series of medium-scale radar images for Greenland and Antarctica and the surrounding seas are presented. The growth and shrinkage of the southern polar sea-ice throughout a full annual cycle is illustrated with the seasonal cycle of patterns on the Antarctic and Greenland Ice Sheets clearly evident. Using the time series and simple scattering models, the locations of key ice facies in Greenland are determined.

51-3838

Estimation of polar stratospheric cloud infrared extinction climatology using visible satellite observations.

Pitts, M.C., Thomason, L.W., *Technical digest series,* 1995, Vol.2, Optical Remote Sensing of the Atmosphere. Topical Meeting, Salt Lake City, UT, Feb. 5-9, 1995. Postconference edition, p.108/TuC9-1-TuC9-3/110, 4 refs.

DLC QC871.O67 1995

Polar stratospheric clouds, Ozone, Atmospheric composition, Infrared radiation, Aerosols, Simulation, Meteorological instruments

Polar stratospheric clouds (PSCs) provide surfaces for heterogeneous processes which can dramatically alter the normal partitioning of odd nitrogen and chlorine families in the winter polar stratospheres setting up conditions for significant ozone depletion as manifested in the springtime antarctic ozone hole. A new remote sensor, the Improved Limb Atmospheric Spectrometer (ILAS), is scheduled to be launched in 1996 on the Advanced Earth Observing Satellite (ADEOS) in a Sun-synchronous orbit. ILAS will be using solar occultation to observe the composition of the high-latitude upper troposphere and stratosphere in the infrared region and the near-visible region. Observations from the ILAS sensor may provide additional information on the climatology of PSC occurrence as well as information on PSC composition and type. In this study, the authors have estimated the optical signals of PSCs in the infrared and discuss the possibility of identifying PSC occurrences using the ILAS data, as well as the effect of PSCs on the ILAS retrieval of gaseous species.

51-3839

Stratospheric effects of Mount Pinatubo aerosol studies with a coupled two-dimensional model.

Rosenfield, J.E., Considine, D.B., Meade, P.E., Bacmeister, J.T., Jackman, C.H., Schoeberl, M.R., *Journal of geophysical research,* Feb. 20, 1997, 102(D3), p.3649-3670, Refs. p.3668-3670.

Climatology, Polar stratospheric clouds, Cloud physics, Ozone, Degradation, Atmospheric circulation, Global change, Heterogeneous nucleation, Aerosols, Volcanic ash, Photochemical reactions, Models

A new interactive radiative-dynamical-chemical zonally averaged two-dimensional model has been developed at Goddard Space Flight Center. The model includes a linear planetary wave parameterization featuring wave-mean flow interaction and the direct calculation of eddy mixing from planetary wave dissipation. It utilizes family gas phase chemistry approximations and includes heterogeneous chemistry on the surfaces of both stratospheric sulfate aerosols and polar stratospheric clouds in both polar regions. This model has been used to study the effects of the sulfate aerosol cloud formed by the eruption of Mount Pinatubo in June 1991 on stratospheric temperatures, dynamics, and chemistry. The net predicted perturbations to the column ozone amount were low-latitude depletions of 2-3% and northern and southern high-latitude depletions of 10-12%, in good agreement with observations. The sensitivity of the predicted perturbations to changes in the specification of the planetary wave forcings was examined. The maximum globally averaged column ozone depletions ranged from 2 to 4% for the cases studied. (Auth. mod.)

51-3840

Application of impedance spectroscopy for selecting frost hardy varieties of English ryegrass.

Repo, T., Pulli, S., *Annals of botany,* Nov. 1996, 78(5), p.605-609, 17 refs.

Plant ecology, Grasses, Plant physiology, Frost resistance, Cold tolerance, Acclimatization, Cold weather tests, Plant tissues, Damage, Spectroscopy, Electrical measurement, Temperature effects

51-3841

Age model estimation in paleoclimatic research: fuzzy regression and radiocarbon uncertainties.

Boreux, J.J., Pesti, G., Duckstein, L., Nicolas, J., *Palaeogeography, palaeoclimatology, palaeoecology,* Feb. 1997, 128(1-4), p.29-37, 20 refs.

Geochronology, Paleoclimatology, Radioactive age determination, Accuracy, Sedimentation, Layers, Statistical analysis, Classifications

51-3842

New quantitative palaeoclimate data for the Late Cretaceous Arctic: evidence for a warm polar ocean.

Herman, A.B., Spicer, R.A., *Palaeogeography, palaeoclimatology, palaeoecology,* Feb. 1997, 128(1-4), p.227-251, Refs. p.249-251.

Paleoclimatology, Paleoecology, Paleobotany, Vegetation patterns, Classifications, Stratigraphy, Climatic changes, Oceans, Water temperature, Surface temperature, Statistical analysis, Arctic Ocean

51-3843

Musts of successful cold-weather concreting.

Imse, D., Krueger, J., Moss, N.R., *Concrete construction,* Jan. 1997, 42(1), p.11-17, 2 refs.

Winter concreting, Reinforced concretes, Concrete admixtures, Cold weather performance, Concrete placing, Concrete curing, Concrete strength, Temperature control, Compressive properties, Frost resistance, Protection

51-3844

Moon rivers.

Zimmerman, R., *Sciences,* Mar.-Apr. 1997, 37(2), p.11.

Satellites (natural), Spaceborne photography, Geologic structures, Extraterrestrial ice, Ground ice, Regolith, Tectonics, Subsurface structures, Oceans

51-3845

Predicted age-depth scales for Siple Dome and inland WAIS ice cores in west Antarctica.

Nereson, N.A., Waddington, E.D., Raymond, C.F., Jacobson, H.P., *Geophysical research letters,* Nov. 1, 1996, 23(22), p.3163-3166, 22 refs.

Paleoclimatology, Climatic changes, Ice sheets, Ice cores, Ice dating, Glacier flow, Glacier thickness, Statistical analysis, Correlation, Mathematical models, Antarctica—Siple Coast, Antarctica—West Antarctica

Geophysical data are used with ice flow models and generalized accumulation histories to estimate age and annual layer thickness versus depth for two anticipated ice core sites in West Antarctica: Siple Dome and an inland site on the West Antarctic Ice Sheet. This modeling experiment predicts that 10^4 year-old ice is at ca. 50% depth and 10^5 year-old ice is at ca. 90% depth at both sites. Both of these cores could contain climate information through the last glacial cycle with annual resolution through the Holocene. The predicted similarity in resolution and record length between the two cores suggests that they could be compared to obtain both spatial and temporal information about the paleoclimate and history of the West Antarctic ice sheet. (Auth. mod.)

51-3846

Volcanic ash from Icelandic ~57,300 yr BP eruption found in GISP2 (Greenland).

Ram, M., Donarummo, J., Jr., Sheridan, M., *Geophysical research letters,* Nov. 1, 1996, 23(22), p.3167-3169, 7 refs.

Pleistocene, Quaternary deposits, Ice sheets, Ice cores, Aerosols, Volcanic ash, Aggregates, Particle size distribution, Chemical analysis, Ice dating, Correlation, Origin, Greenland, Iceland

51-3847

Climate forcing by stratospheric ozone depletion calculated from observed temperature trends.

Zhong, W.Y., Toumi, R., Haigh, J.D., *Geophysical research letters,* Nov. 1, 1996, 23(22), p.3183-3186, 25 refs.

Climatology, Polar atmospheres, Stratosphere, Radiation balance, Atmospheric composition, Degradation, Ozone, Air temperature, Profiles, Temperature variations

The radiative forcing of the surface-troposphere system caused by stratospheric ozone depletion in the 1980s is calculated using observed values of change in ozone and temperature. The seasonal variation of the ozone and temperature trends produces strong seasonal and latitudinal variations in radiative forcing. The balance between peak positive solar forcing and maximum negative longwave forcing shifts the peak negative forcing at the South Pole from Nov. to Oct. The time difference between peak ozone loss and maximum temperature decrease results in net positive values in Southern Hemisphere mid-latitudes in Aug. and Sep. Positive values also occur at low latitudes in both hemispheres. The globally and annually averaged net radiative forcing is much less than that previously reported using fixed dynamical heating model temperature changes. Ozone radiative forcing is very sensitive to the vertical profile of temperature change. (Auth. mod.)

51-3848

Possible role of atmosphere-biosphere interactions in triggering the last glaciation.

de Noblet, N.I., Prentice, I.C., Joussaume, S., Texier, D., Botta, A., Haxeltine, A., *Geophysical research letters,* Nov. 1, 1996, 23(22), p.3191-3194, 36 refs.

Glaciation, Glacier oscillation, Paleoclimatology, Paleoecology, Global change, Vegetation patterns, Migration, Snow line, Snow depth, Simulation, Snow cover effect

51-3849

Polar vortex conditions during the 1995-96 arctic winter: meteorology and MLS ozone.

Manney, G.L., Santee, M.L., Froidevaux, L., Waters, J.W., Zurek, R.W., *Geophysical research letters,* Nov. 1, 1996, 23(22), p.3203-3206, 12 refs.

Climatology, Polar atmospheres, Remote sensing, Atmospheric composition, Aerosols, Heterogeneous nucleation, Degradation, Ozone, Polar stratospheric clouds, Air temperature, Seasonal variations, Temperature effects

51-3850

Polar vortex conditions during the 1995-96 arctic winter: MLS ClO and HNO_3.

Santee, M.L., Manney, G.L., Read, W.G., Froidevaux, L., Waters, J.W., *Geophysical research letters,* Nov. 1, 1996, 23(22), p.3207-3210, 13 refs.

Climatology, Polar atmospheres, Polar stratospheric clouds, Detection, Cloud physics, Aerosols, Condensation, Heterogeneous nucleation, Ozone, Remote sensing, Seasonal variations

51-3851

On the possibility of complicated dynamic behavior of atmospheric photochemical systems: instability of the antarctic photochemistry during the ozone hole formation.

Feigin, A.M., Konovalov, I.B., *Journal of geophysical research,* Nov. 20, 1996, 101(D20), p.26,023-26,038, 52 refs.

Climatology, Polar atmospheres, Cloud physics, Degradation, Polar stratospheric clouds, Ozone, Heterogeneous nucleation, Photochemical reactions, Periodic variations, Oscillations, Forecasting, Mathematical models, Simulation

The authors suggest a new approach to studying atmospheric photochemical processes by analyzing an atmospheric photochemical system as a dynamic system possessing many degrees of freedom and demonstrate a good agreement between the antarctic photochemical system (APCS) behavior described by a three-order set of ordinary differential equations and ozone variations taking place during ozone hole phenomenon. The dynamic properties of this set under the parameter values corresponding to the antarctic stratosphere conditions during the last decade show that APCS may become unstable as a result of the loss of equilibrium state stability and/or as a result of the self-oscillations appearance. Some arguments are presented in favor of close connection between the APCS instability and anomalous deep depletion of antarctic ozone concentration in spring observed since the mid-1980s. (Auth. mod.)

51-3852

Temporal and spatial variations of hydrometeor orientations in thunderstorms.

Metcalf, J.I., *Journal of applied meteorology,* Apr. 1997, 36(4), p.315-321, 7 refs.

Precipitation (meteorology), Thunderstorms, Cloud physics, Cloud electrification, Electric fields, Ice dielectrics, Ice crystals, Orientation, Radar echoes, Polarization (waves)

51-3853

Identification of hydrometeors with elliptical and linear polarization K_a-band radar.

Reinking, R.F., Matrosov, S.Y., Bruintjes, R.T., Martner, B.E., *Journal of applied meteorology,* Apr. 1997, 36(4), p.322-339, 19 refs.

Precipitation (meteorology), Climatology, Cloud physics, Radar echoes, Ice crystal size, Snow crystal structure, Snow pellets, Dendritic ice, Ice crystal optics, Backscattering, Polarization (waves), Detection, Classifications

51-3854

Ozone and aerosol observed by lidar in the Canadian Arctic during the winter of 1995/96.

Donovan, D.P., et al, *Geophysical research letters,* Nov. 15, 1996, 23(23), p.3317-3320, 12 refs.

Climatology, Polar atmospheres, Polar stratospheric clouds, Atmospheric circulation, Aerosols, Ozone, Turbulent diffusion, Degradation, Profiles, Seasonal variations, Lidar, Canada—Northwest Territories—Eureka

51-3855

OClO, NO_2 and O_3 total column observations over Iceland during the winter 1993/94.

Gil, M., Puentedura, O., Yela, M., Parrondo, C., Jadhav, D.B., Thorkelsson, B., *Geophysical research letters,* Nov. 15, 1996, 23(23), p.3337-3340, 25 refs.

Climatology, Subpolar regions, Atmospheric composition, Stratosphere, Aerosols, Ozone, Spectroscopy, Photometry, Spectra, Radiation absorption, Iceland

51-3856

^{14}C "bomb spike" determines the age spread and age of CO_2 in Law Dome firn and ice.

Levchenko, V.A., et al, *Geophysical research letters,* Nov. 15, 1996, 23(23), p.3345-3348, 24 refs.

Climatology, Atmospheric composition, Gases, Carbon dioxide, Fallout, Radioactive isotopes, Ice sheets, Firn, Ice cores, Ice dating, Bubbles, Radioactive age determination, Geochemical cycles, Antarctica—Law Dome

The authors report a precise, model-independent determination of the age and age spread of CO_2 in air trapped in ice. A large pulse of atmospheric radiocarbon, generated in the atmosphere by nuclear tests, peaked in the early-to-mid 1960s. The profile of the radiocarbon "bomb spike" in firn air and ice bubbles from high snow-accumulation sites drilled in 1987 and 1993 in Law Dome, East Antarctica, is measured by employing high precision AMS (Accelerator Mass Spectrometry). Large ^{14}C atmospheric growth rates and a high signal-to-noise ratio lead to a direct and precise determination of the CO_2 age and age-spread in the ice. A least-squares comparison with the atmospheric history gives a mean CO_2 age of 8.9±0.5 years at the bottom of the firn with an age spread in the ice of 12.5±1.5 years. These results confirm the possibility of examining decadal trace gas variations prior to direct instrumental measurements. (Auth. mod.)

51-3857

Global warming in a coupled climate model including oceanic eddy-induced advection.

Hirst, A.C., Gordon, H.B., O'Farrell, S.P., *Geophysical research letters,* Nov. 15, 1996, 23(23), p.3361-3364, 13 refs.

Climatology, Surface temperature, Global warming, Heat flux, Ocean currents, Advection, Sea ice distribution, Ice cover effect, Air ice water interaction, Models

The Gent and McWilliams (GM) parameterization for large-scale water transport caused by mesoscale oceanic eddies is introduced into the oceanic component of a global coupled ocean-atmosphere model. Parallel simulations with and without the GM scheme are performed to examine the effect of this parameterization on model behavior under constant atmospheric CO_2 and on the model response to increasing CO_2. The transient (increasing CO_2) runs show moderate differences in the rate of oceanic heat sequestration (less in the GM case), as expected based on passive tracer uptake studies. However, the surface warming is weaker in the GM case, especially over the southern ocean, which is contrary to some recent supposition. Reasons for the reduced warming in the GM case are discussed. (Auth. mod.)

51-3858

Shear-wave velocity structure of the crust and upper mantle beneath the Kola peninsula.

Dricker, I.G., Roecker, S.W., Kosarev, G.L., Vinnik, L.P., *Geophysical research letters,* Nov. 15, 1996, 23(23), p.3389-3392, 15 refs.

Subpolar regions, Earth crust, Geological surveys, Tectonics, Magma, Geologic structures, Seismic surveys, Seismic velocity, Wave propagation, Russia—Kola Peninsula

51-3859

***T*-matrix computations of zenith-enhanced lidar from horizontally oriented ice plates.**

Mishchenko, M.I., Wielaard, D.J., Carlson, B.E., *Geophysical research letters,* Apr. 1, 1997, 24(7), p.771-774, 16 refs.

Cloud physics, Optical properties, Ice crystal optics, Light scattering, Backscattering, Lidar, Ice crystal structure, Orientation, Particle size distribution, Statistical analysis, Simulation, Infrared radiation

51-3860

Dehydration and sedimentation of ice particles in the arctic stratospheric vortex.

Vömel, H., et al, *Geophysical research letters,* Apr. 1, 1997, 24(7), p.795-798, 18 refs.

Climatology, Cloud physics, Degradation, Ozone, Polar stratospheric clouds, Radio echo soundings, Freezing points, Water vapor, Desiccation, Backscattering, Sedimentation, Environmental tests

51-3861

Evidence of substantial ozone depletion in winter 1995/96 over northern Norway.

Hansen, G., Svenøe, T., Chipperfield, M.P., Dahlback, A., Hoppe, U.P., *Geophysical research letters,* Apr. 1, 1997, 24(7), p.799-802, 16 refs.

Climatology, Polar atmospheres, Ozone, Profiles, Degradation, Atmospheric composition, Lidar, Photometry, Turbulent diffusion, Models, Seasonal variations, Norway

51-3862

Shuttle imaging radar (SIR-C/X-SAR) reveals near-surface properties of the South Patagonian Icefield.

Forster, R.R., Isacks, B.L., Das, S.B., *Journal of geophysical research,* Oct. 25, 1996, 101(E10), p.23,169-23,180, 36 refs.

Remote sensing, Glacier surveys, Spaceborne photography, Glacial hydrology, Synthetic aperture radar, Glacier surfaces, Classifications, Glacier oscillation, Wet snow, Snow cover structure, Mapping, Seasonal variations, Chile—South Patagonian Ice field

51-3863

Streamflow measurement using salt dilution in tundra streams, Northwest Territories, Canada.

Spence, C., McPhie, M., *American Water Resources Association. Journal,* Apr. 1997, 33(2), p.285-291, 7 refs.

Watersheds, Tundra terrain, Stream flow, Hydrography, Salting, Solubility, Chemical composition, Velocity measurement, Correlation, Canada—Northwest Territories

51-3865

Hot mantle transition zone beneath Iceland and the adjacent Mid-Atlantic Ridge inferred from P-to-S conversion at the 410- and 660-km discontinuities.

Shen, Y., Solomon, S.C., Bjarnason, I.T., Purdy, G.M., *Geophysical research letters,* Dec. 1, 1996, 23(24), p.3527-3530, 20 refs.

Subpolar regions, Tectonics, Geological surveys, Seismic surveys, Seismic velocity, Structural analysis, Phase transformations, Geochemistry, Thermal analysis, Iceland

51-3866

Large-scale sedimentation on the glacier-influenced polar North Atlantic margins: long-range side-scan sonar evidence.

Dowdeswell, J.A., et al, *Geophysical research letters,* Dec. 1, 1996, 23(24), p.3535-3538, 21 refs.

Oceanographic surveys, Pleistocene, Quaternary deposits, Sedimentation, Ice shelves, Glacier flow, Glacial geology, Glacial deposits, Marine deposits, Stratigraphy, Imaging, Acoustic measurement, Models, Atlantic Ocean

51-3867

Heat flow highs on the Norwegian-Barents-Svalbard continental slope: deep crustal fractures, dewatering, or "memory in the mud"?

Vogt, P.R., Sundvor, E., *Geophysical research letters,* Dec. 1, 1996, 23(24), p.3571-3574, 18 refs.

Marine geology, Underwater geothermal measurement, Subpolar regions, Heat flux, Earth crust, Thermal analysis, Ocean bottom, Temperature gradients, Water erosion, Atlantic Ocean, Norway—Svalbard

51-3868

Prediction of iceberg trajectories for the North Atlantic and Arctic Oceans.

Bigg, G.R., Wadley, M.R., Stevens, D.P., Johnson, J.A., *Geophysical research letters,* Dec. 1, 1996, 23(24), p.3587-3590, 23 refs.

Oceanography, Sea ice distribution, Icebergs, Drift, Distribution, Glacial hydrology, Glacier mass balance, Calving, Air ice water interaction, Advection, Mathematical models, Forecasting, Arctic Ocean, Atlantic Ocean

51-3869

Influence of Okhotsk sea-ice extent on atmospheric circulation.

Honda, M., Yamazaki, K., Tachibana, Y., Takeuchi, K., *Geophysical research letters,* Dec. 1, 1996, 23(24), p.3595-3598, 16 refs.

Oceanography, Atmospheric boundary layer, Sea ice distribution, Air ice water interaction, Ice cover effect, Atmospheric circulation, Wind direction, Wave propagation, Young ice, Advection, Heat flux, Thermodynamics, Mathematical models, Japan—Hokkaido, Okhotsk Sea

51-3870

Mechanism of incorporation of trace gases in ice grown from the gas phase.

Dominé, F., Thibert, E., *Geophysical research letters,* Dec. 1, 1996, 23(24), p.3627-3630, 23 refs.

Ice physics, Cloud physics, Ice cores, Ice composition, Snow composition, Gases, Solubility, Turbulent diffusion, Ice vapor interface, Snow air interface, Vapor transfer, Microanalysis

51-3871

Evidence for continuing current in sprite-producing cloud-to-ground lightning.

Reising, S.C., Inan, U.S., Bell, T.F., Lyons, W.A., *Geophysical research letters,* Dec. 1, 1996, 23(24), p.3639-3642, 14 refs.

Atmospheric physics, Atmospheric electricity, Cloud electrification, Light (visible radiation), Ionization, Lightning, Radio waves, Low frequencies, Antarctica—Palmer Station

Radio atmospherics, launched by sprite-producing positive cloud-to-ground lightning flashes and observed at Palmer Station, exhibit large extra low-frequency (ELF) slow tails following the initial very low-frequency (VLF) portion, indicating the presence of continuing currents in the source lightning flashes. One-to-one correlation of sferics with NLDN lightning data in both time and arrival azimuth allows unambiguous identification of lightning flashes originating in the storm of interest. Slow-tail measurements at Palmer can potentially be used to measure continuing currents in lightning flashes over nearly half of the Earth's surface. (Auth. mod.)

51-3872

Very high frequency tides observed in the airglow over Eureka (80°).

Walterscheid, R.L., Sivjee, G.G., *Geophysical research letters,* Dec. 1, 1996, 23(24), p.3651-3654, 23 refs.

Atmospheric physics, Polar atmospheres, Atmospheric electricity, Electric fields, Light (visible radiation), Solar radiation, Wave propagation, Oscillations, Spectra, Canada—Northwest Territories—Eureka

51-3873

Lidar observations of a large high-altitude sporadic Na layer during active aurora.

Collins, R.L., Hallinan, T.J., Smith, R.W., Hernandez, G., *Geophysical research letters,* Dec. 1, 1996, 23(24), p.3655-3658, 24 refs.

Atmospheric physics, Atmospheric composition, Subpolar regions, Atmospheric electricity, Lidar, Geomagnetism, Layers, Metals, Spectroscopy, United States—Alaska—Poker Flat

51-3874

Beryllium-10 in the Taylor Dome ice core: applications to antarctic glaciology and paleoclimatology.

Steig, E.J., Seattle, University of Washington, 1996, 167p., University Microfilms no. 96-30116, Ph.D. thesis. Refs. p.150-167.

Ice cores, Ice sheets, Paleoclimatology, Ice composition, Ice models, Glacier flow, Ice dating, Atmospheric composition, Snow accumulation, Geochemistry, Antarctica—Taylor Dome

A continuous profile of beryllium-10 obtained for a 554-m ice core is used to establish an accumulation-rate history at Taylor Dome, taking into account remaining uncertainties in production rates, deposition mechanisms, and atmospheric mixing processes. A preliminary interpretation of the accumulation-rate record indicates that climate conditions at Taylor Dome are strongly influenced by conditions in the Ross Sea, particularly the configuration of the Ross Ice Shelf. These results show that the Taylor Dome core can be used to provide new constraints on regional climate over the last 130,000 years, complementing the terrestrial and marine geologic record from the Dry Valleys, Transantarctic Mountains and western Ross Sea. (Auth. mod.)

51-3875

Investigation of dynamic sea ice processes in the Weddell Sea during 1992.

Geiger, C.A., MP 4032, Hanover, Dartmouth College, 1996, 378p., University Microfilms order No. 96-39440, Ph.D. thesis. This thesis was partially funded by CRREL (No. 5-36686.140). Refs. p.369-378.

Sea ice distribution, Ice deformation, Ice models, Rheology, Ice water interface, Air water interactions, Oceanographic surveys, Meteorological data, Mathematical models, Data processing, Antarctica—Weddell Sea

Through a series of case studies, signal processing and statistical tools, analyses of dynamic sea ice processes of drift, deformation, and ice pack expansion and decay are investigated for the Weddell Sea region during 1992. Cavitating fluid (CAV) and viscous-plastic (VP) models are the most widely used ice models in sea ice, ocean and climate communities. Examination of these and observations are presented in order to identify the external (air/ocean) and internal (ice) forces that affect specific processes. Inconsistencies between processes in models and observations are isolated and examined with suggestions given for the next generation of ice models. Key findings are as follows: Observationally, from ISW 1992, ice velocity in western Weddell is found to be driven by low frequency forcing (>one day), while subdaily frequencies drive ice deformation. Mechanistic studies increase understanding in simulated ice performance under idealized conditions. In the models, annual expansion during winter months is dominated by air temperature at the ice edge and storms in the interior where sensible/latent heat fluxes are large, especially in leads. Suggestions for next generation models include a reformulation of the boundary layer and incorporation of high frequency tidal forcing. (Auth. mod.)

51-3876

Seasonal variation of bacteria in sea ice contaminated by diesel fuel and dispersed crude oil.

Delille, D., Bassères, A., Dessommes, A., *Microbial ecology,* Mar.-Apr. 1997, 33(2), p.97-105, 64 refs.

Bacteria, Biomass, Sea ice, Impurities, Hydrocarbons, Seasonal variations, Oil spills, Antarctica—Adélie Coast

The long-term effects of diesel fuel and "Arabian light" crude oil contamination on microbial communities was investigated in landfast ice located in the Adélie Coast area. After oil addition, the changes in bacterial communities were studied in situ during a 9-month period in winter 1993. Weekly sampling in sea ice allowed a regular survey of total, saprophytic, and hydrocarbon utilizing bacteria. A clear seasonality was observed. In uncontaminated samples, maximal values of bacterial biomass occurred during ice formation and just before summer thaw. Minimal bacterial abundance was observed during winter. All the results (bacterial abundance, colony-forming units, and most probable number counts of hydrocarbon-utilizing bacteria) clearly revealed a significant response of antarctic bacterial communities to hydrocarbon contamination. Three orders of magnitude increases of bacterial counts occurred in sea ice after both diesel fuel and crude oil contamination. (Auth. mod.)

51-3877

Factors affecting bacterial productivity in soils on isolated inland nunataks in continental Antarctica.

Harris, J.M., Tibbles, B.J., *Microbial ecology,* Mar.-Apr. 1997, 33(2), p.106-123, 74 refs.

Cryobiology, Cryogenic soils, Bacteria, Geochemistry, Nunataks, Microbiology, Biomass, Soil microbiology, Antarctica—Queen Maud Land

Heterotrophic bacterial production rates in soils on inland nunataks in western Queen Maud Land were investigated by field and laboratory experiments. Bacterial densities and productivities, and nutrient and physical parameters of soils from 4 different habitats were compared: soil from beneath moss beds, soil from the nests of the snow petrel *(Pagodroma nivea),* exposed unvegetated soil (polygon soil) 5 m away from nests, and exposed polygon soil on nunataks without the nests of breeding birds. Organic content, and nitrogen and carbon concentrations were significantly higher in soils from nests of the snow petrel than in all other soil types. Moisture levels in soils from nest entrances and beneath mosses were much higher than in soils from unvegetated exposed polygons. Polygon soils from nunataks without breeding birds exhibited the lowest nutrient content. Soils in nests and moss beds represent bacterial "hotspots" in an extensive matrix of exposed polygon soils, supporting denser bacterial populations and enhanced bacterial productivity. (Auth. mod.)

51-3878

Ice tank tests on rafting of a broken ice field.

Tuhkuri, J., Lensu, M., *Helsinki University of Technology. Ship Laboratory. Report,* 1997, M-218, 73p., 19 refs.

Sea ice distribution, Ice mechanics, Ice formation, Ice rafting, Ice loads, Ice pileup, Profiles, Ice solid interface, Ice friction, Mechanical tests, Pressure ridges, Velocity measurement, Simulation

51-3879

Arctic '96: Polarstern Ice Station report.

Lensu, M., et al, *Helsinki University of Technology. Ship Laboratory. Report,* 1996, M-214, 91p.

Oceanographic surveys, Drift stations, Ice floes, Ice surveys, Ice conditions, Snow depth, Snow ice interface, Ice cover thickness, Radiometry, Ice breaking, Trafficability

51-3880

Detection of water ice in Comet Hale-Bopp.

Davies, J.K., et al, *Icarus,* May 1997, 127(1), p.238-245, 26 refs.

Extraterrestrial ice, Ice detection, Ice water interface, Solutions, Ice spectroscopy, Radiation absorption, Reflectivity, Spectra, Amorphous ice

51-3881

Shoot and root sensitivity of containerized black spruce, white spruce and jack pine seedlings to late fall freezing.

Bigras, F.J., Margolis, H.A., *New Forests,* May 1997, 13(1-3), p.29-49, 36 refs.

Forestry, Plant tissues, Plant physiology, Frost resistance, Cold tolerance, Growth, Damage, Roots, Protection, Cold weather tests, Temperature effects

51-3882

Effect of sub-zero temperatures in the light and dark on cold-hardened, dehardened and newly flushed white spruce (*Picea glauca* [Moench.] Voss) seedlings.

Gillies, S.L., Binder, W.D., *New Forests,* May 1997, 13(1-3), p.91-104, Refs. p.101-104.

Forestry, Trees (plants), Plant physiology, Frost resistance, Cold tolerance, Low temperature tests, Freezing, Chlorophylls, Damage, Photosynthesis, Temperature effects, Light effects

51-3883

Sea ice identification using dual-polarized Ku-band scatterometer data.

Yueh, S.H., Kwok, R., Lou, S.H., Tsai, W.Y., *IEEE transactions on geoscience and remote sensing,* May 1997, 35(3), p.560-569, 29 refs. For another version see 51-2456 or F-56716.

Sea ice distribution, Ice detection, Ice edge, Classifications, Ice water interface, Spacecraft, Radar echoes, Backscattering, Polarization (waves), Statistical analysis

This paper describes a classification algorithm using dual-polarized scatterometer measurements to identify the edge of the sea ice cover in both arctic and antarctic regions. The distinct polarization scattering signatures of sea ice and open water are discussed and illustrated with the dual-polarized radar measurements from the Seasat-A scatterometer (SASS). The analysis of SASS data suggests that the ratio of vertical and horizontal polarization backscatter, denoted as the copol ratio, is a useful discriminator of sea ice and open ocean. A simple classification algorithm using the thresholds of the copol ratio and backscatter levels is proposed. The feasibility of this algorithm is demonstrated using the SASS data from the single-sided, dual-polarization mode. The results indicate that the dual-polarized measurements from the NASA scatterometer (NSCAT) can be used to produce routine maps of sea ice edges. (Auth. mod.)

51-3884

Use of ERS-1 SAR data in snow melt monitoring.

Koskinen, J.T., Pulliainen, J.T., Hallikainen, M.T., *IEEE transactions on geoscience and remote sensing,* May 1997, 35(3), p.601-610, 28 refs.

Snow hydrology, Snow surveys, Snow cover distribution, Subarctic landscapes, Snow hydrology, Wet snow, Snowmelt, Seasonal variations, Spaceborne photography, Synthetic aperture radar, Vegetation patterns, Sensor mapping, Snow cover effect, Snow water equivalent

51-3885

Snow and snowmelt in the high mountains of Crete—climatic, hydrologic and geomorphic effects. [Schneefall und Tauen in Kretas Hochgebirgen—klimatologische, hydrologische und geomorpologische Effekte]

Hempel, L., *Petermanns Geographische Mitteilungen,* 1997, No.1, p.17-34, In German with English and Russian summaries. 23 refs.

Geomorphology, Mountains, Snow hydrology, Snowmelt, Runoff, Snow accumulation, Seasonal variations, Meteorological factors, Mountain soils, Snow erosion, Water erosion, Greece—Crete

51-3886

Glacier dynamics in western Norway—chronology and causes of the present ice advance at Jostedalsbreen. [Glaziale dynamik in Westnorwegen—Ablauf und Ursachen des aktuellen Gletschervorstoßes am Jostedalsbreen]

Winkler, S., Haakensen, N., Nesje, A., Rye, N., *Petermanns Geographische Mitteilungen,* 1997, No.1, p.43-63, In German with English and Russian summaries. 67 refs.

Glaciology, Shores, Glacier oscillation, Glacier tongues, Meteorological factors, Glacier mass balance, Climatic factors, Periodic variations, Correlation, Statistical analysis, Norway

51-3887

Phytoplankton of the Barents Sea—the end of a growth season.

Hegseth, E.N., *Polar biology,* Mar. 1997, 17(3), p.235-241, 38 refs.

Marine biology, Oceanographic surveys, Biomass, Ecosystems, Plankton, Growth, Distribution, Seasonal variations, Hydrography, Ice edge, Photosynthesis, Nutrient cycle, Sampling, Barents Sea

51-3888

Pelagic microbial activity in the Northeast Water polynya, summer 1992.

Ritzrau, W., *Polar biology,* Mar. 1997, 17(3), p.259-267, 42 refs.

Oceanographic surveys, Marine biology, Polynyas, Ocean bottom, Suspended sediments, Ecosystems, Bacteria, Nutrient cycle, Biomass, Water chemistry, Chlorophylls, Statistical analysis, Greenland—Northeast Water Polynya

51-3889

Glacial features and snow-line trend during the last glacial age in the Southern Apennines (Italy) and on Albanian and Greek mountains.

Boenzi, F., Palmentola, G., *Zeitschrift für Geomorphologie,* Mar. 1997, 41(1), p.21-29, With German and French summaries. 21 refs.

Pleistocene, Glacier oscillation, Geomorphology, Mountain soils, Snow line, Quaternary deposits, Glacial deposits, Moraines, Altitude, Geochronology, Italy—Apennines, Greece, Albania

51-3890

Glacial history of the northwest Picos de Europa of northern Spain.

Gale, S.J., Hoare, P.G., *Zeitschrift für Geomorphologie,* Mar. 1997, 41(1), p.81-96, With German and French summaries. 37 refs.

Pleistocene, Glacial geology, Mountain glaciers, Geomorphology, Landforms, Glacial erosion, Alpine landscapes, Moraines, Bedrock, Profiles, Quaternary deposits, Spain—Picos de Europa

51-3891

New age determinations of periglacial slope deposits in the Vorderer Bayerischere Wald. [Neue Befunde zum Alter der periglazialen Deckschichten im Vorderen Bayerischen Wald]

Völkel, J., Mahr, A., *Zeitschrift für Geomorphologie,* Mar. 1997, 41(1), p.131-137, In German with English summary. 5 refs.

Pleistocene, Geomorphology, Mountain soils, Slope processes, Sedimentation, Peat, Stratification, Periglacial processes, Geochronology, Radioactive age determination, Quaternary deposits, Correlation, Germany—Bayerischer Wald

51-3892

50,000 years of recorded global volcanism.

Hammer, C.U., Clausen, H.B., Langway, C.C., Jr., *Climatic change,* Jan. 1997, 35(1), p.1-15, 23 refs.

Pleistocene, Volcanoes, Volcanic ash, Quaternary deposits, Sediment transport, Aerosols, Ice sheets, Ice cores, Ice dating, Isotope analysis, Geochronology

The 2191 m long ice core recovered at Byrd Station in 1968 was measured continuously by an electrical conductivity method (ECM). The ECM curve infers the acidity of seasonal ice layers and major peaks, which identify clearly intermediate and prominent past volcanic activity over the last 50,000 years. Also presented are recent data for a suite of the most striking volcanic events that occurred around 17.5 ka±0.5 BP. These events emitted enormous amounts of HCl and HF into the atmosphere. (Auth. mod.)

51-3893

Comparison of global climate change simulations for 2 X CO_2-induced warming—an intercomparison of 108 temperature change projections published between 1980 and 1995.

Kacholia, K., Reck, R.A., *Climatic change,* Jan. 1997, 35(1), p.53-69, Refs. p.63-69.

Climatology, Climatic changes, Air temperature, Carbon dioxide, Greenhouse effect, Global change, Global warming, Statistical analysis, Simulation, Mathematical models, Bibliographies

51-3894

Problem of paleo-analogs.

Crowley, T.J., *Climatic change,* Jan. 1997, 35(1), p.119-121, 17 refs.

Paleoclimatology, Climatic changes, Global warming, Temperature variations, Statistical analysis, Accuracy, Long range forecasting, Greenhouse effect

51-3895

Comparison of paleotemperature reconstructions as evidence for the paleo-analog hypothesis.

Kheshgi, H.S., Schlesinger, M.E., Lapenis, A.G., *Climatic change,* Jan. 1997, 35(1), p.123-131, 17 refs.

Paleoclimatology, Climatic changes, Global change, Models, Temperature variations, Accuracy, Statistical analysis, Long range forecasting, Theories

51-3896

Universal pattern of changes—on what spatial scale?—comment on H.S. Kheshgi, M.E. Schlesinger and A.G. Lapenis.

Shabalova, M.V., *Climatic change,* Jan. 1997, 35(1), p.133-135, 7 refs.

Paleoclimatology, Climatic changes, Temperature variations, Models, Simulation, Accuracy, Statistical analysis, Long range forecasting, Global change, Theories

51-3897

Study of substorm-associated nightside spike events in auroral absorption using imaging riometers at South Pole and Kilpisjärvi.

Hargreaves, J.K., Browne, S., Ranta, H., Ranta, A., Rosenberg, T.J., Detrick, D.L., *Journal of atmospheric and solar-terrestrial physics,* May 1997, 59(8), p.853-872, 14 refs.

Atmospheric physics, Atmospheric electricity, Polar atmospheres, Geomagnetism, Sounding, Radiation absorption, Radio waves, Imaging, Antarctica—South Pole, Finland—Kilpisjärvi

The short-duration 'spike' events which are a common feature of substorm-associated auroral radio absorption in the midnight sector are observed both at Kilpisjärvi in the auroral zone and at the much higher latitude of the South Pole. It is found that the spike events are remarkably similar at the two latitudes studied. They are usually elliptical in shape with the major axis generally along rather than across the L shells; median dimensions are 167 km by 74 km at the South Pole, and 190 km by 80 km at Kilpisjärvi. It may be significant that in each case the perturbed region of the ionosphere maps to an almost circular region at the magnetospheric equatorial plane, and that the total magnetic flux included within the event is similar at each latitude. The velocities of the events are variable in the range of several 100 m/s to 2 or 3 km/s; the direction of motion tends to be poleward at the beginning of a precipitation event, and is often equatorward towards the end. (Auth. mod.)

51-3898

Co-ordinated studies using imaging riometer and incoherent scatter radar.

Collis, P.N., Hargreaves, J.K., *Journal of atmospheric and solar-terrestrial physics,* May 1997, 59(8), p.873-890, 36 refs.

Atmospheric physics, Polar atmospheres, Atmospheric electricity, Electric fields, Geomagnetism, Sounding, Radiation absorption, Radio waves, Scattering, Correlation, Imaging

51-3899

Localized absorption events in the afternoon sector.

Ranta, H., Ranta, A., Hargreaves, J.K., Browne, S., *Journal of atmospheric and solar-terrestrial physics,* May 1997, 59(8), p.891-902, 28 refs.

Atmospheric physics, Polar atmospheres, Atmospheric electricity, Electric fields, Geomagnetism, Wave propagation, Sounding, Radio waves, Radiation absorption, Spectra, Imaging

51-3900

Location, spatial scale and motion of radio waves absorption in the cusp-latitude ionosphere observed by imaging riometers.

Nishino, M., Yamagishi, H., Stauning, P., Rosenberg, T.J., Holtet, J.A., *Journal of atmospheric and solar-terrestrial physics,* May 1997, 59(8), p.903-924, 28 refs.

Atmospheric physics, Atmospheric electricity, Electric fields, Radio waves, Radiation absorption, Geomagnetism, Imaging, Sounding

51-3901

Development of a high-resolution imaging riometer for the middle and upper atmosphere observation program at Poker Flat, Alaska.

Murayama, Y., et al, *Journal of atmospheric and solar-terrestrial physics,* May 1997, 59(8), p.925-937, 18 refs.

Atmospheric physics, Atmospheric electricity, Subpolar regions, Electric fields, Geomagnetism, Sounding, Radio waves, Ionization, Radiation absorption, Construction, Imaging, Performance, Antennas, United States—Alaska—Poker Flat

51-3902

Plans for a new-rio-imager experiment in northern Scandinavia.

Nielsen, E., Hagfors, T., *Journal of atmospheric and solar-terrestrial physics,* May 1997, 59(8), p.939-949, 10 refs.

Atmospheric physics, Atmospheric electricity, Polar atmospheres, Electric fields, Radiation measurement, Ionization, Radio waves, Radiation absorption, Design, Antennas, Imaging

51-3903

Ice-induced stresses in the shell plating of ice-going vessels.

Riska, K., Windeler, M., *Helsinki University of Technology. Ship Laboratory. Report,* 1997, M-219, 34p., 13 refs.

Ships, Ice loads, Plates, Steel structures, Shells, Structural analysis, Ice mechanics, Ice solid interface, Ice pressure, Stress concentration, Design criteria, Mathematical models, Tensile properties, Statistical analysis, Simulation

51-3904

Structurally ordered surface layers of water at the SiO_2/ice interface and influence of adsorbed molecules of protein hydrolysate on them.

Turov, V.V., Barvinchenko, V.N., *Colloids and surfaces,* Mar. 3, 1997, 8(3), p.125-132, 23 refs.

Ice physics, Frozen liquids, Hygroscopic water, Solutions, Polymers, Nuclear magnetic resonance, Adsorption, Spectra, Ice water interface, Temperature effects, Hydrates, Layers, Molecular energy levels

51-3905

New approach to calculating Holocene winter precipitation by combining glacier equilibrium-line altitudes and pine-tree limits: a case study from Hardangerjøkulen, central southern Norway.

Dahl, S.O., Nesje, A., *Holocene,* Dec. 1996, 6(4), p.381-398, Refs. p.395-398.

Paleoclimatology, Precipitation (meteorology), Glacier oscillation, Glacier mass balance, Ablation, Forest lines, Altitude, Paleoecology, Quaternary deposits, Radioactive age determination, Isostasy, Correlation, Norway—Hardangerjøkulen

51-3906

Assessing AMS ^{14}C ages of detrital organics from Holocene and late-Pleistocene moraines, east-central Sierra Nevada, California, USA.

Pohl, M.M., Hajdas, I., Bonani, G., *Holocene,* Dec. 1996, 6(4), p.463-467, 53 refs.

Pleistocene, Glacial geology, Soil dating, Moraines, Carbon isotopes, Radioactive age determination, Lithology, Profiles, Organic soils, Correlation, United States—California—Sierra Nevada

51-3907

Magnetic measurements of Greenland and Himalayan ice-core samples.

Sahota, J.T.S., Mayewski, P.A., Oldfield, F., Twickler, M.S., *Holocene,* Dec. 1996, 6(4), p.477-480, 25 refs.

Glaciology, Quaternary deposits, Dust, Ice cores, Ice composition, Geochemistry, Geochronology, Sampling, Remanent magnetism, Scanning electron microscopy, Correlation, Greenland, India—Himalaya Mountains

51-3908

Thermal structure of the winter middle atmosphere observed by lidar at Thule, Greenland, during 1993-1994.

Marenco, F., di Sarra, A., Cacciani, M., Fiocco, G., Fuà, D., *Journal of atmospheric and solar-terrestrial physics,* Jan. 1997, 59(2), p.151-158, 12 refs.

Climatology, Subpolar regions, Air temperature, Stratification, Profiles, Stratosphere, Lidar, Thermal analysis, Temperature variations, Seasonal variations, Sounding, Correlation, Polar atmospheres, Greenland

51-3909

Trends in daily wintertime temperatures in the northern stratosphere.

Pawson, S., Naujokat, B., *Geophysical research letters,* Mar. 1, 1997, 24(5), p.575-578, 9 refs.

Climatology, Air temperature, Winter, Cloud physics, Polar stratospheric clouds, Temperature effects, Periodic variations, Radio echo soundings, Statistical analysis

51-3910

Springtime antarctic total ozone measurements in the early 1970s from the BUV instrument on Nimbus 4.

Stolarski, R.S., Labow, G.J., McPeters, R.D., *Geophysical research letters,* Mar. 1, 1997, 24(5), p.591-594, 13 refs.

Climatology, Climatic changes, Polar atmospheres, Spacecraft, Ultraviolet radiation, Spectroscopy, Sounding, Backscattering, Ozone, Degradation, Seasonal variations

Data from the Backscatter Ultraviolet (BUV) instrument on the Nimbus 4 satellite have been used to construct maps of the measured total ozone field over the antarctic region during the austral springs of 1970 through 1973. These maps show an October mean ozone distribution similar to that measured in 1979 by the Nimbus 7 TOMS instrument. These ozone maps during the 1970s are very different from those measured during the late 1980s and early 1990s. The ozone distribution for each of the years during the early 1970s is characterized by a circumpolar, crescent-shaped maximum surrounding a shallow minimum centered near the pole. The total ozone amounts in the polar minimum region in the early 1970s average about 300 Dobson units, comparable to the amounts measured at that time over Halley Bay and Showa Station. (Auth. mod.)

51-3911

Simultaneous observations of polar stratospheric clouds and HNO_3 over Scandinavia in January, 1992.

Massie, S.T., et al, *Geophysical research letters,* Mar. 1, 1997, 24(5), p.595-598, 22 refs.

Climatology, Polar atmospheres, Cloud physics, Polar stratospheric clouds, Ozone, Degradation, Aerosols, Sounding, Radiometry, Heterogeneous nucleation, Turbulent diffusion

51-3912

New evidence of size and composition of polar stratospheric cloud particles.

Goodman, J., Verma, S., Pueschel, R.F., Hamill, P., Ferry, G.V., Webster, D., *Geophysical research letters,* Mar. 1, 1997, 24(5), p.615-618, 29 refs.

Climatology, Polar atmospheres, Polar stratospheric clouds, Cloud physics, Sampling, Ice crystal growth, Ice crystal structure, Heterogeneous nucleation, Ozone, Evaporation, Replicas, Degradation, Ice crystal replicas

A NASA Ames ER-2 aircraft encountered polar stratospheric cloud particles in the Antarctic in July 1994 during the ASHOE/MAESA deployment. Stratospheric particles were collected by impaction techniques on specially treated substrates. For the first time, Nitron-nitrate reaction spots were detected on the ice crystal replicas, indicating the presence of NO_3^- ions on/in ice. Because the reaction spots were detected only on very small crystals ($r<1$ μm) and never on larger crystals, suggest that the amount of NO_3^- coating sufficient to initiate reactions will accumulate during ice crystal evaporation in ice subsaturated air. This may slow down the evaporation rate and enable ice crystals to survive longer in subsaturated environment. That provides an explanation of why on both days ice crystals were replicated at temperatures above the frost point, when their appearance and size suggest substantial evaporation. (Auth. mod.)

51-3913

Second-order expansion of Gibbs-Thomson equation and melting point depression of ice crystallite.

Mori, A., Maruyama, M., Furukawa, Y., *Physical Society of Japan. Journal,* Sep. 1996, 65(9), p.2742-2744, 9 refs.

Ice physics, Ice melting, Melting points, Thermodynamics, Analysis (mathematics), Interfacial tension, Ice water interface, Liquid phases, Statistical analysis

51-3914

Software for estimating particles size distributions in polar stratospheric clouds from experimental data.

Mandolini, S., Adriani, A., *Rome. Consiglio Nazionale delle Ricerche. Istituto di Fisica dell'Atmosfera,* July 1996, IFA R.I. 96-7, 23p., In Italian with English summary. 3 refs.

Polar stratospheric clouds, Particle size distribution, Aerosols, Meteorological instruments, Data processing, Experimentation, Antarctica—McMurdo Station

The software for estimating the parameters of the PSC's particle size distribution, from data gathered by an Optical Particle Counter (OPC), is described. This instrument, developed at the University of Wyoming, yields the concentration of the particles (assumed to be spherical) with radius greater than a fixed value. The OPC is balloon-borne and can be transported with other scientific instruments, such as the Laser Backscatter Sonde (LABS) developed in the Frascati laboratories of IFA-CNR. The parameters of the size distribution are used to make a comparison between the backscattering coefficient calculated by Mie theory and the one calculated by experimental values of LABS or a lidar. This makes an estimation of the refraction index possible. For estimating the parameters of the PSC's particle size distribution, the software improves, with a step by step process, the agreement between experimental data and the curve calculated from theory. (Auth. mod.)

51-3915

Surface mass balance and snow surface properties from the Lambert Glacier basin traverses 1990-94.

Higham, M., Craven, M., *Australia. Cooperative Research Centre for the Antarctic and Southern Ocean Environment (Antarctic CRC). Research report,* Mar. 1997, No.9, 129p., 17 refs.

Traverses, Glacier mass balance, Snow surface, Firn, Physical properties, Snow density, Topographic surveys, Meteorological data, Antarctica—Lambert Glacier

Oversnow traverses have collected a variety of glaciological measurements around the interior drainage basin of the Lambert Glacier between 1989-90 and 1994-95. The main traverse route covers approximately 2000 km with elevations in the range 1000-3000 m. This report details the results of surface mass balance, 10-m firn temperature, stable isotope, density, microrelief, stratigraphy and climatology measurements made over the entire traverse route. The average surface mass balance over the major portion of the route above 2000 m elevation is 76 (σ=74)/kgm^2/a (approximately 190 mm of snow equivalent per year). Spatially averaged snow surface mass balance (30 km smoothed) within the basin varies from lows around 30/kgm^2/a to highs of 150/kgm^2/a, major spatial changes in the net balance pattern being controlled primarily by topography. Interannual variability for the basin is high. Data from shallow cores also provide valuable information on the physical properties of the near-surface firn, but give no reliable estimate of past accumulation due to the overall low accumulation regime and wind redistribution which disturbs annual layers. (Auth. mod.)

51-3916

Oceans and climate: circulation and interbasin exchanges in the Southern Ocean.

De Ruijter, W.P.M., Walsteijn, F.H., Feron, R.C.V., *Studies in environmental science,* 1995, No.65A, International Climate Change Research Conference, Maastricht, Dec. 6-9, 1994. Proceedings. Climate change research: evaluation and policy implications. Edited by S. Zwerver, R.S.A.R van Rompaey, M.T.J. Kok and M.M. Berk, p.347-356, 34 refs.

DLC QC981.8.C5C6 1995

Ocean currents, Climate, Air water interactions

The Antarctic Circumpolar Current (ACC) is an essential component of the climate system in that it accomplishes a significant poleward flux of heat and exchanges water masses and properties between the South Atlantic, Pacific, and Indian oceans. Characterization of the dynamical balance of the ACC, as provided by measurements and models studied, are discussed.

51-3917

Land ice and sea level change.

Oerlemans, J., Conrads, L.A., *Studies in environmental science,* 1995, No.65A, International Climate Change Research Conference, Maastricht, Dec. 6-9, 1994. Proceedings. Climate change research: evaluation and policy implications. Edited by S. Zwerver, R.S.A.R van Rompaey, M.T.J. Kok and M.M. Berk, p.375-380, 19 refs.

DLC QC981.8.C5C6 1995

Ice sheets, Glacier mass balance, Land ice, Sea level, Snow accumulation, Simulation

A simple meteorological model has been developed to simulate the temperature and precipitation distribution over the antarctic continent. When run with appropriate boundary conditions (annual mean insolation and temperature at the ocean boundary), the model gives a satisfactory simulation of the meridional profiles of temperature and accumulation on the antarctic ice sheet (annual mean state).

51-3918

Stresses in the lithosphere caused by glacial loads.

Johnston, P., Cloetingh, S., *Studies in environmental science,* 1995, No.65A, International Climate Change Research Conference, Maastricht, Dec. 6-9, 1994. Proceedings. Climate change research: evaluation and policy implications. Edited by S. Zwerver, R.S.A.R van Rompaey, M.T.J. Kok and M.M. Berk, p.381-384, 8 refs.

DLC QC981.8.C5C6 1995

Stresses, Ice loads, Ice pressure, Simulation, Ice sheets, Isostasy

51-3919

Response of permafrost ecosystems to climate change.

Koster, E.A., *Studies in environmental science,* 1995, No.65A, International Climate Change Research Conference, Maastricht, Dec. 6-9, 1994. Proceedings. Climate change research: evaluation and policy implications. Edited by S. Zwerver, R.S.A.R van Rompaey, M.T.J. Kok and M.M. Berk, p.385-388, 13 refs.

DLC QC981.8.C5C6 1995

Air temperature, Atmospheric composition, Climatic changes, Permafrost heat balance, Simulation, Permafrost transformation

51-3920

Fatigue behavior of cantilever beams of saline ice.

Bond, P.E., Langhorne, P.J., *Journal of cold regions engineering,* June 1997, 11(2), p.99-112, 26 refs.

Sea ice, Salt ice, Ice growth, Ice strength, Flexural strength, Dynamic loads, Mechanical tests, Ice solid interface, Fatigue (materials), Statistical analysis

51-3921

Concept of effective strain rate: different approaches.

Matskevitch, D.G., *Journal of cold regions engineering,* June 1997, 11(2), p.113-129, 23 refs.

Sea ice, Ice mechanics, Strains, Ice deformation, Fracture zones, Penetration, Ice solid interface, Compressive properties, Brittleness, Analysis (mathematics), Classifications, Terminology

51-3922

Dusting procedures for advance ice-jam mitigation measures.

White, K.D., Kay, R.L., MP 4033, *Journal of cold regions engineering,* June 1997, 11(2), p.130-145, 27 refs.

River ice, Ice breakup, Ice jams, Ice cover strength, Dusting, Radiation absorption, Reflectivity, Ice melting, Countermeasures, Airplanes, Ice conditions, Forecasting, Tests

In areas where damaging spring breakup ice jams are recurring events, advance mitigation measures should be considered. One mitigation measure that might be used in advance of ice breakup is aerial dusting of the ice, which enhances the natural weakening process. Because there may be limited time in which to organize and implement advance measures for ice jams, dusting operations should be planned beforehand. This paper provides a brief overview of the physical processes involved in ice dusting and discusses important aspects of a dusting plan. Experiences from two dusting programs in Nebraska were used as the basis for developing a set of guidelines for planning dusting operations. A spreadsheet for estimating dusting costs was also developed, and is presented with actual data from a 1994 dusting operation.

51-3923

Thermoviscoelastic constitutive equations for polycrystalline ice.

Schapery, R.A., *Journal of cold regions engineering,* June 1997, 11(2), p.146-157, 22 refs.

Ice physics, Ice mechanics, Analysis (mathematics), Viscoelasticity, Mathematical models, Ice elasticity, Stress concentration, Strains, Thermodynamics

51-3924

Low-rate ice-scraping tests.

Nixon, W.A., DeJong, D., *Journal of cold regions engineering,* June 1997, 11(2), p.159-166, 5 refs.

Road icing, Ice removal, Concrete pavements, Bituminous concretes, Ice solid interface, Mechanical tests, Abrasion, Ice cutting, Stress concentration, Orientation, Simulation

51-3925

Numerical reconstruction of a soft-bedded Laurentide ice sheet during the last glacial maximum: comment and reply.

Mooers, H.D., Clark, P.U., Licciardi, J.M., MacAyeal, D.R., Jenson, J.W., *Geology,* Apr. 1997, 25(4), p.379-381, 32 refs. For pertinent paper see 50-6539.

Pleistocene, Glacial geology, Glacier flow, Glacier oscillation, Moraines, Deformation, Ice sheets, Ice edge, Glacier beds, Mathematical models, Simulation

51-3926

Relation between soil age and silicate weathering rates determined from the chemical evolution of a glacial chronosequence: comment and reply.

Dahms, D.E., et al, *Geology,* Apr. 1997, 25(4), p.381-383, 22 refs. For pertinent paper see 50-1806.

Glacial geology, Geochronology, Moraines, Soil erosion, Soil profiles, Soil dating, Weathering, Geochemistry, Eolian soils

51-3927

New results on the Pleistocene glaciation of the Japanese Alps (Honshu) and the "Hettner Stein" problem—a preliminary report.

Kerschner, H., Heuberger, H., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1997, 33(1), p.1-14, With German summary. 25 refs.

Pleistocene, Paleoclimatology, Geomorphology, Glacial geology, Alpine glaciation, Volcanic ash, Quaternary deposits, Glacier oscillation, Snow line, Stratigraphy, Alpine glaciation, Age determination, Japan—Japanese Alps

51-3928

Evidence of Middle Pleistocene glaciation in SW-Kamchatka.

Zech, W., Bäumler, R., Savoskul, O., Braitseva, O.A., Melekestsev, I.V., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1997, 33(1), p.15-20, With German summary. 18 refs.

Pleistocene, Glaciation, Glacial geology, Geomorphology, Moraines, Sampling, Geochronology, Stratigraphy, Russia—Kamchatka Peninsula

51-3929

Electrical resistivity measurements of Grizzly Creek rock glaciers (Northwest Territories, Canada). [Mésures de résistivité électrique sur les glaciers rocheux de Grizzly Creek (Territoire du Yukon, Canada)]

Assier, A., Fabre, D., Evin, M., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1997, 33(1), p.21-34, In French with English summary. 39 refs.

Glacial geology, Rock glaciers, Subarctic landscapes, Moraines, Talus, Periglacial processes, Frozen rocks, Ice solid interface, Sounding, Electrical measurement, Electrical resistivity, Canada—Northwest Territories

51-3930

Recession of the Shumsky Glacier in the Djungarski Alatau Range, Kazakhstan, central Asia.

Cherkasov, P.A., Akhmetova, G.S., Hastenrath, S., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1997, 33(1), p.35-40, With German summary. 13 refs.

Glacier oscillation, Ice volume, Mountain glaciers, Glacial geology, Glacier surveys, Moraines, Geomorphology, Profiles, Topographic surveys, Periodic variations, Kazakhstan—Shumsky Glacier

51-3931

Mass balance of Griesgletscher 1961-1994: different methods of determination.

Funk, M., Morelli, R., Stahel, W., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1997, 33(1), p.41-56, With German summary. 7 refs.

Glaciology, Glacier mass balance, Seasonal variations, Geodetic surveys, Altitude, Glacier thickness, Snow water equivalent, Statistical analysis, Switzerland—Griesgletscher

51-3932

Topoclimatological analysis of the reduction of the glaciers in the Zugspitz region, Bavaria.

Arck, M., Escher-Vetter, H., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1997, 33(1), p.57-72, With German summary. 21 refs.

Glaciology, Mountain glaciers, Glacier oscillation, Glacier mass balance, Glacier ablation, Climatic factors, Topographic features, Insolation, Heat balance, Seasonal variations, Germany—Zugspitz

51-3933

Bulk model of the atmospheric boundary layer for inclusion in mass balance models of the Greenland ice sheet.

Van den Broeke, M.R., *Zeitschrift für Gletscherkunde und Glazialgeologie,* 1997, 33(1), p.73-94, With German summary. Refs. p.92-94.

Climatology, Climatic changes, Ice sheets, Glacier mass balance, Heat transfer, Atmospheric boundary layer, Ice air interface, Turbulent exchange, Topographic effects, Wind factors, Wind velocity, Mathematical models, Greenland

51-3934

Terrestrial carbon storage during the past 200 years: a Monte Carlo analysis of CO_2 data from ice core and atmospheric measurements.

Bruno, M., Joos, F., *Global biogeochemical cycles,* Mar. 1997, 11(1), p.111-124, Refs. p.122-124.

Climatology, Geochemical cycles, Global change, Atmospheric composition, Carbon dioxide, Ice sheets, Ice cores, Chemical analysis, Correlation, Models, Statistical analysis, Antarctica—Law Dome

The authors have updated earlier deconvolution analyses using most recent high-precision ice core data from Law Dome for the last millennium and direct atmospheric CO_2 observations starting in 1958. The study interprets nonfossil emissions, that is, the difference between the increase in observed atmospheric plus modeled oceanic carbon inventory and fossil emissions, as biospheric carbon storage (release). Uncertainties in the CO_2 ice core data have been assessed using a Monte Carlo approach. A 2-σ uncertainty for the nonfossil emissions (20-year averages) was found. The temporal evolution of the required biota sink is not compatible with conventional modeling of CO_2 fertilization. Thus it seems not likely that the cumulative sink of 76 GtC which is required to balance land use emissions during 1935 to 1990 can be explained by climate variations only. (Auth. mod.)

51-3935

FTIR studies of CO-water complexes in argon matrices and in porous ices.

Givan, A., Loewenschuss, A., Nielsen, C.J., *Chemical Society, London. Journal. Faraday transactions,* Dec. 21, 1996, 92(24), p.4927-4933, 18 refs.

Ice physics, Ice spectroscopy, Infrared spectroscopy, Porosity, Molecular structure, Solutions, Ice solid interface, Ice surface, Adsorption, Low temperature tests, Temperature effects

51-3936

Measurements of diurnal heat exchange on the Quelccaya Ice Cap, Peruvian Andes.

Hastenrath, S., *Meteorology and atmospheric physics,* 1997, 62(1-2), p.71-78, 26 refs.

Glaciology, Mountain glaciers, Glacier oscillation, Glacier ablation, Glacier mass balance, Snow air interface, Snow heat flux, Ice sublimation, Snow surface temperature, Diurnal variations, Radiant cooling, Peru—Andes

51-3937

Loess—origins, stratigraphy, landscape. [Löss—Herkunft-Gliederung-Landschaften]

Pésci, M., Richter, G., *Zeitschrift für Geomorphologie,* 1996, Suppl.98, 391p., In German with English summary. Refs. p.353-391.

Pleistocene, Quaternary deposits, Sedimentation, Eolian soils, Loess, Stratigraphy, Lithology, Classifications, Terminology, Geomorphology, Landforms, Geochronology

51-3938

Decision support system for real-time snow and ice control—final report.

Miedema, H.J., Wright, J.R., *Indiana Department of Transportation. Report,* Sep. 1996, FHWA/IN/JHRP-95(4), 79p., 64 refs.

Roads, Winter maintenance, Ice control, Snow removal, Cold weather performance, Cost analysis, Logistics, Meteorological data, Weather forecasting

51-3939

Chemical composition of cometary nuclei.

Delsemme, A.H., Comets. Edited by L.L. Wilkening, Tucson, University of Arizona Press, 1982, p.85-130, Refs. p.126-130.

DLC QB721.C648

Extraterrestrial ice, Ice physics, Ice composition, Ice sublimation, Porous materials, Geochemistry, Organic nuclei, Vapor transfer

51-3940

What are comets made of? A model based on interstellar dust.

Greenberg, J.M., Comets. Edited by L.L. Wilkening, Tucson, University of Arizona Press, 1982, p.131-163, Refs. p.160-163.

DLC QB721.C648

Extraterrestrial ice, Ice physics, Amorphous ice, Cosmic dust, Chemical composition, Aggregates, Radiation absorption, Photochemical reactions, Infrared radiation, Simulation, Spectra, Models

51-3941

Infrared spectral properties of frozen volatiles.

Fink, U., Sill, G.T., Comets. Edited by L.L. Wilkening, Tucson, University of Arizona Press, 1982, p.164-202, Refs. p.199-202.

DLC QB721.C648

Extraterrestrial ice, Ice physics, Frost, Clathrates, Ice composition, Frozen liquids, Geochemistry, Reflectivity, Radiation absorption, Infrared spectroscopy, Spectra, Simulation

51-3942

Structure and origin of cometary nuclei.

Donn, B., Rahe, J., Comets. Edited by L.L. Wilkening, Tucson, University of Arizona Press, 1982, p.203-226, Refs. p.223-226.

DLC QB721.C648

Extraterrestrial ice, Porous materials, Ice physics, Ice nuclei, Structural analysis, Origin, Cosmic dust, Ice composition, Models, Simulation

51-3943

Prediction of freezing times for regular multi-dimensional foods using simple formulae.

Salvadori, V.O., De Michelis, A., Mascheroni, R.H., *Lebensmittel—Wissenschaft &-Technologie,* 1997, 30(1), p.30-35, 23 refs.

Porous materials, Frozen liquids, Freezing points, Surface structure, Freezing, Forecasting, Phase transformations, Analysis (mathematics), Statistical analysis

51-3944

Simulation of freezing or thawing heat conduction in irregular two-dimensional domains by a boundary-fitted grid method.

Califano, A.N., Zaritzky, N.E., *Lebensmittel—Wissenschaft &-Technologie,* 1997, 30(1), p.70-76, 23 refs.

Freezing points, Frozen liquids, Porous materials, Phase transformations, Heat transfer, Thermal conductivity, Physical properties, Mathematical models, Simulation, Freeze thaw tests, Temperature effects

51-3945

Empirical equation for estimating food enthalpy in a freezing temperature range.

Miki, H., Hayakawa, K.I., *Lebensmittel—Wissenschaft und-Technologie,* 1996, 29(7), p.659-663, 10 refs.

Porous materials, Frozen liquids, Enthalpy, Water content, Analysis (mathematics), Freeze thaw cycles, Temperature effects, Heat transfer, Forecasting, Thermodynamics

51-3946

Heaters also thaw frozen ground. *Concrete construction,* Dec. 1996, 41(12), p.1029.

Cold weather construction, Ground thawing, Heating, Portable equipment, Pipes (tubes), Heat transfer, Thaw depth, Construction equipment

51-3947

Ion dependent luminescence of pulse-irradiated aqueous electrolyte solutions at very low temperatures—mechanism of emission.

Wypych, M., Kroh, J., *Radiation physics and chemistry,* Apr. 1996, 47(4), p.563-569, 31 refs.

Ice physics, Low temperature tests, Solutions, Frozen liquids, Luminescence, Spectra, Ion exchange, Charge transfer, Ice spectroscopy

51-3948

Scattering properties of dense media from Monte Carlo simulations with application to active remote sensing of snow.

Zurk, L.M., Stang, L., Winebrenner, D.P., *Radio science,* July-Aug. 1996, 31(4), p.803-819, 20 refs.

Remote sensing, Snow optics, Snow cover structure, Metamorphism (snow), Microwaves, Backscattering, Attenuation, Polarization (waves), Ice dielectrics, Statistical analysis, Simulation

51-3949

Estimation of surface snow properties using combined millimeter-wave backscatter and near-infrared reflectance measurements.

Narayanan, R.M., Jackson, S.R., *International journal of infrared and millimeter waves,* May 1997, 18(5), p.959-990, 30 refs.

Snow optics, Remote sensing, Snow cover structure, Physical properties, Radar echoes, Backscattering, Reflectivity, Correlation, Unfrozen water content, Grain size, Models, Statistical analysis, Classifications

51-3950

Environmental control of flowering in some northern *Carex* species.

Heide, O.M., *Annals of botany,* Mar. 1997, 79(3), p.319-327, 23 refs.

Plants (botany), Grasses, Growth, Plant ecology, Biomass, Cold weather tests, Simulation, Light effects, Temperature effects

51-3951

Preliminary study of physical and mechanical properties of model ice.

Li, Z.J., Riska, K., *Helsinki University of Technology. Ship Laboratory. Report,* 1996, M-212, 100p. + appends., 31 refs.

Sea ice, Artificial ice, Ice models, Ice makers, Ice mechanics, Ice strength, Stability, Mechanical properties, Simulation, Mechanical tests, Ice solid interface, Flexural strength, Dynamic loads

51-3952

Geologic mapping in Victoria Land, Antarctica, based on multispectral satellite data.

Casacchia, R., Salvatori, R., Petrangeli, A., *SPIE—The International Society for Optical Engineering. Proceedings,* 1995, Vol.2587, Geographic information systems, photogrammetry, and geological/geophysical remote sensing, edited by J.B. Lurie, J. Pearson and E. Zilioli, p.2-9, 9 refs.

DLC G70.212.G4456 1995

Moraines, LANDSAT, Image processing, Geological surveys, Geological maps, Photointerpretation, Photogrammetry, Antarctica—Victoria Land

Image processing techniques have been applied to Landsat TM images of Victoria Land to enhance both the spectral contrast and the spatial information. The test site is located west of the Terra Nova Bay area, south of the terminal part of the Priestly Glacier and includes mountainous ranges characterized by alpine morphology, a large plateau and valley glaciers. Rock units are mainly constituted by a metamorphic complex, granitoids and supraglacial moraines. A method based on principal component transform and on high-pass convolution filtering has allowed to produce an image map where the spectral and the spatial information of the different surface units were combined. The detection of outcrop boundaries has been improved as well as the visual interpretation of their morphologic features. In general rock units corresponds to those mapped by means of geological field survey. Morainic deposits are well discernible from the *in situ* material appearing different, after processing, in texture and color from the intrusives and metamorphic Complexes. (Auth.)

51-3953

Research and measurement program at the ANTARES AMS facility.

Tuniz, C., et al, *Nuclear instruments and methods in physics research B,* Mar. 1997, 123(1-4), International Conference on Accelerator Mass Spectrometry (AMS-7), Tucson, AZ, May 20-24, 1996. Proceedings, p.73-78, 11 refs.

Research projects, Atmospheric composition, Meteorological instruments, Isotopes, Air ice water interaction, Paleoclimatology

The ANTARES AMS facility is fully operational and supports a research program in environmental science, with emphasis on global climate change and nuclear safeguards. A measurement program for external projects involving Australian and overseas institutions is also carried out, mainly in Quaternary science studies. Some selected projects of the program, including research in Antarctica, are outlined. (Auth. mod.)

51-3954

Measurement of $^{14}CO_2$ bomb pulse in firn and ice at Law Dome, Antarctica.

Levchenko, V.A., et al, *Nuclear instruments and methods in physics research B,* Mar. 1997, 123(1-4), International Conference on Accelerator Mass Spectrometry (AMS-7), Tucson, AZ, May 20-24, 1996. Proceedings, p.290-295, 23 refs.

Impurities, Ice composition, Firn, Ice cores, Fallout, Atmospheric composition, Measuring instruments, Antarctica—Law Dome

$^{14}CO_2$ produced in the atmosphere by nuclear weapons testing in the 1960s is now incorporated in the air bubbles of antarctic ice. The high atmospheric radiocarbon growth rates through the period of tests and subsequent decline provide a unique and independent test for the smoothing of atmospheric CO_2 signals due to firn diffusion and bubble close off. The level of smoothing quantifies the time resolution with which atmospheric trace gas histories can be reconstructed from ice cores. In this paper, the methodologies for the preparation and AMS measurements of ice core and firn $^{14}CO_2$ from high accumulation sites at Law Dome are detailed. The results are compared with predictions of a numerical model incorporating firn air diffusion and bubble close-off. The sample sizes, precision of measurements and sources of contamination are discussed for both firn and ice samples. (Auth.)

51-3955

Glacial climate and glacier distribution in the tropics. [Gletscherklima und Gletscherverbreitung in den Tropen]

Jordan, E., Vechta, Germany, Universität Osnabrück, Abteilung Vechta, [1990], p.27-32, WDCA 93000115, In German.

Glacier surveys, Mountain glaciers, Glacier oscillation, Glacial meteorology, Paleoclimatology

51-3956

Thermal mapping.

Lewis, J.E., Del Grande, N., McKendry, I., Durbin, P., Leppäranta, M., *Finnish Institute of Marine Research, Helsinki. Internal report,* 1992, No.9, ERS-1 Baltic Sea ice calibration/validation post-experiment report/PIPOR [Programme for International Polar Oceans Research]/Finland. Edited by M. Leppäranta and M. Lensu, p.55-59, 2 refs.

Ice surveys, Sea ice distribution, Ice conditions, Ice detection, Ice reporting, Ice temperature, Aerial surveys, Infrared mapping, Infrared photography, Baltic Sea

51-3957

Use of low temperature scanning electron microscopy to examine snow crystals.

Wergin, W.P., Erbe, E.F., International Congress on Electron Microscopy, 13th, Paris, France, July 17-22, 1994, 1994, p.993-994, WDCA 95000152, 4 refs.

Snow crystal structure, Ice crystal replicas, Scanning electron microscopy

51-3958

Application of results from the research project "A Ship in Compressive Ice" to ship operability.

Riska, K., Kujala, P., Gol'dshteĭn, R.V., Danilenko, V.I., Osipenko, N.M., *Helsinki University of Technology. Ship Laboratory. Report,* 1996, M-209, 16p., 8 refs. Presented at the 13th International Conference on Port and Ocean Engineering Under Arctic Conditions, Murmansk, Russia, Aug. 15-18, 1995, but not included in the proceedings.

Ships, Ice solid interface, Ice loads, Ice pressure, Metal ice friction, Ice cover strength, Ice breaking, Ice navigation, Research projects, Ice cover strength, Ice breaking

51-3959

Modelling of edge cracking and flaking of brittle plates and wedges.

Gol'dshteĭn, R.V., Osipenko, N.M., Tuhkuri, J., *Helsinki University of Technology. Ship Laboratory. Report,* 1997, M-216, 27p., 28 refs.

Ice cover strength, Ice deformation, Ice breaking, Ice cracks, Crack propagation, Mathematical models

51-3960

Impedance spectroscopy for the evaluation of corrosion inhibitors in highway deicers.

Bertocci, U., *U.S. Federal Highway Administration. Report,* Mar. 1997, FHWA-RD-96-178, 73p., 15 refs.

Road icing, Chemical ice prevention, Salting, Road maintenance, Reinforced concretes, Concrete durability, Corrosion, Weatherproofing

51-3961

Annual report 1995. [Årsberetning 1995]

Dansk Polarcenter. Kommissionen for Videnskabelige Undersøgelser i Grønland (Danish Polar Center. Commission for Scientific Research in Greenland), Copenhagen, 1996, 35p., In Danish with English and Greenlandic summaries. Refs. passim.

Organizations, Research projects, International cooperation, Regional planning, Environmental protection, Cost analysis, Greenland

51-3962

Annual report 1996. [Årsberetning 1996]

Dansk Polarcenter. Kommissionen for Videnskabelige Undersøgelser i Grønland (Danish Polar Center. Commission for Scientific Research in Greenland), Copenhagen, [1997], 32p., In Danish with English and Greenlandic summaries. Refs. passim.

Organizations, Research projects, Stations, International cooperation, Regional planning, Environmental protection, Cost analysis, Greenland

51-3963

Effect of hypoxia, cold and exercise on human thermoregulation.

Reading, J.E., Roberts, D.E., Hodgdon, J.A., Pozos, R.S., *U.S. Naval Health Research Center, San Diego, CA. Report,* 1996, No.96-37, 18p., 30 refs.

Cold exposure, Cold weather operation, Physiological effects, Health

51-3964

Air quality in the U.S. Marine Corps 4-man tent.

Roberts, D.E., Canine, K.M., Freedman, M.S., *U.S. Naval Health Research Center, San Diego, CA. Report,* 1996, No.96-33, 13p., 13 refs.

Portable shelters, Cold weather tests, Ventilation, Physiological effects, Health

51-3965

Comparison of anti-exposure suits during rest and arm exercise in cold water.

Shannon, M.P., et al, *U.S. Naval Health Research Center, San Diego, CA. Report,* 1995, No.95-41, 20p., 31 refs.

Cold exposure, Cold weather survival, Clothing, Physiological effects, Health, Human factors engineering

51-3966

Danish polar researchers. A directory. [Danske polarforskere. En vejviser]

Dansk Polarcenter (Danish Polar Center), Copenhagen, 1996, 62p., In Danish.

Organizations, Research projects

51-3967

Arctic science, engineering and education. Directory of awards, fiscal year—1996.

U.S. National Science Foundation, Washington, D.C., 1996, 98p., NSF 97-78.

Research projects, Legislation, Cost analysis, International cooperation, Education, Engineering, Organizations

51-3968

Spatial snow model for predatory/prey interactions.

Ringleb, R., Martinka, C., Dagre, D., Liston, G., Potts, D., Willard, E., William T. Pecora Symposium, 12th, Sioux Falls, SD, Aug. 24-26, 1993. Proceedings. Land information from space-based systems, Bethesda, American Society for Photogrammetry and Remote Sensing, 1994, p.350-359, 19 refs.

DLC G70.39.W55

Snow surveys, Snow cover distribution, Remote sensing, Snow depth, Snow cover effect, Ecology, Models, Forecasting, Meteorological factors

51-3969

Mapping frozen ground from space: lessons from the first Radiobrightness Energy Balance Experiment.

Galantowicz, J.F., England, A.W., William T. Pecora Symposium, 12th, Sioux Falls, SD, Aug. 24-26, 1993. Proceedings. Land information from space-based systems, Bethesda, American Society for Photogrammetry and Remote Sensing, 1994, p.494-498, 3 refs.

DLC G70.39.W55

Climatology, Soil air interface, Frozen ground, Seasonal freeze thaw, Classifications, Remote sensing, Radiation balance, Sensor mapping, Radiometry, Brightness, Snow cover effect, Spacecraft, Simulation

51-3970

Time lags and novel ecosystems in response to transient climatic change in arctic Alaska.

Chapin, F.S., III, Starfield, A.M., *Climatic change*, Apr. 1997, 35(4), p.449-461, Refs.p. 449-461.

Climatology, Climatic changes, Global warming, Subpolar regions, Forest ecosystems, Forest lines, Landscape development, Vegetation patterns, Forest tundra, Revegetation, Simulation, Temperature effects, United States—Alaska

51-3971

Spring ice-jam flooding of the Peace-Athabasca Delta: evidence of a climatic oscillation.

Timoney, K., Peterson, G., Fargey, P., Peterson, M., McCanny, S., Wein, R., *Climatic change*, Apr. 1997, 35(4), p.463-483, Refs. p.481-483.

Climatology, Climatic changes, Ecosystems, Hydrologic cycle, Deltas, Water level, Flooding, Seasonal variations, Statistical analysis, Flow control, Ice jams, Solar radiation, Canada—Alberta—Peace-Athabasca Delta

51-3972

Anomalous ground warming versus surface air warming in the Canadian prairie provinces.

Majorowicz, J.A., Skinner, W.R., *Climatic change*, Apr. 1997, 35(4), p.485-500, 28 refs.

Climatology, Climatic changes, Global warming, Soil temperature, Surface temperature, Temperature variations, Well logging, Boreholes, Profiles, Snow depth, Snow cover effect, Models, Statistical analysis, Canada

51-3973

Great Lakes response to catastrophic inflows from Lake Agassiz: some simulations of a hydraulic geometry for chained lake systems.

Tinkler, K.J., Pengelly, J.W., *Journal of paleolimnology*, May 1995, 13(3), p.251-266, 24 refs.

Limnology, Pleistocene, Glacial lakes, Lake bursts, Flooding, Water level, Hydraulics, Hydrography, Channels (waterways), Damping, Geomorphology, Mathematical models, Simulation, Great Lakes

51-3974

Paleolakes on Mars.

Wharton, R.A., Jr., Crosby, J.M., McKay, C.P., Rice, J.W., Jr., *Journal of paleolimnology*, May 1995, 13(3), p.267-283, 80 refs.

Mars (planet), Extraterrestrial ice, Lake ice, Ice cover effect, Meltwater, Limnology, Hydrologic cycle, Water erosion, Sediment transport, Channels (waterways), Geomorphology, Ice cover effect, Theories

51-3975

Synoptic-scale features common to heavy snowstorms in the southeast United States.

Mote, T.L., Gamble, D.W., Underwood, S.J., Bentley, M.L., *Weather and forecasting*, Mar. 1997, 12(1), p.5-23, 36 refs.

Synoptic meteorology, Climatology, Snowstorms, Classifications, Turbulent boundary layer, Advection, Air masses, Moisture transfer, Atmospheric circulation, Weather forecasting

51-3976

Ice phase parameterization in a numerical weather prediction model.

Ødegaard, V., *Weather and forecasting*, Mar. 1997, 12(1), p.127-139, 18 refs.

Precipitation (meteorology), Cloud physics, Condensation, Ice crystal growth, Phase transformations, Ice melting, Snow melting, Moisture transfer, Ice air interface, Heat transfer, Snowfall, Weather forecasting, Mathematical models

51-3977

Use of regression techniques to predict hail size and the probability of large hail.

Billet, J., DeLisi, M., Smith, B.G., Gates, C., *Weather and forecasting*, Mar. 1997, 12(1), p.154-164, 12 refs.

Precipitation (meteorology), Weather forecasting, Ice forecasting, Radio echo soundings, Convection, Turbulent boundary layer, Static stability, Hail, Hailstone structure, Physical properties, Statistical analysis, Mathematical models

51-3978

Comparing PIREPs with NAWAU turbulence and icing forecasts: issues and results.

Kelsch, M., Wharton, L., *Weather and forecasting*, Sep. 1996, 11(3), p.385-390, 7 refs.

Clouds (meteorology), Precipitation (meteorology), Cloud physics, Aircraft icing, Turbulence, Ice forecasting, Weather forecasting, Classifications, Statistical analysis, Accuracy

51-3979

Transmission line corona losses under hoar frost conditions.

Lahti, K., Lahtinen, M., Nousiainen, K., *IEEE transactions on power delivery*, Apr. 1997, 12(2), p.928-933, 3 refs.

Power line icing, Electric corona, Attenuation, Electrical resistivity, Ice accretion, Ice dielectrics, Hoarfrost, Ice solid interface, Ice cover effect, Simulation, Ice cover thickness

51-3980

Paleolimnology of North Pond: watershed-lake interactions.

Huvane, J.K., Whitehead, D.R., *Journal of paleolimnology*, Nov. 1996, 16(3), p.323-354, Refs. p.351-354.

Limnology, Watersheds, Ecosystems, Pleistocene, Quaternary deposits, Lacustrine deposits, Drill core analysis, Paleoecology, Palynology, Forest lines, Stratigraphy, Radioactive age determination, Geochemical cycles, Statistical analysis, Correlation, United States—Massachusetts

51-3981

Ice recrystallization in ice cream: interactions between sweeteners and stabilizers.

Miller-Livney, T., Hartel, R.W., *Journal of dairy science*, Mar. 1997, 80(3), p.447-456, 36 refs.

Colloids, Frozen liquids, Ice crystal growth, Recrystallization, Ice water interface, Molecular energy levels, Cold storage, Freezing points, Freezing rate, Ice prevention, Stability, Temperature effects

51-3982

Initialization and validation of a simulation of cirrus using FIRE-II data.

Westphal, D.L., et al, *Journal of the atmospheric sciences*, Dec. 1, 1996, 53(23), p.3397-3429, 49 refs.

Clouds (meteorology), Synoptic meteorology, Climatology, Cloud physics, Optical properties, Ice crystal size, Ice crystal optics, Radiation balance, Heating, Water vapor, Moisture transfer, Water content, Light scattering, Models, Simulation, Weather forecasting

51-3983

Spectral reflectance and atmospheric energetics in cirrus-like clouds. Part II: applications to a Fourier-Riccati approach to radiative transfer.

Tsay, S.C., Gabriel, P.M., King, M.D., Stephens, G.L., *Journal of the atmospheric sciences*, Dec. 1, 1996, 53(23), p.3450-3467, 32 refs.

Climatology, Clouds (meteorology), Cloud physics, Cloud cover, Optical properties, Detection, Radiance, Light scattering, Ice crystal optics, Reflectivity, Spectra, Statistical analysis, Correlation, Simulation

51-3984

Ion-induced charge separations in growing single ice crystals: effects on growth and interaction processes.

Finnegan, W.G., Pitter, R.L., *Journal of colloid and interface science*, May 15, 1997, 189(2), p.322-327, 19 refs.

Ice physics, Cloud physics, Cloud chambers, Ice dielectrics, Condensation nuclei, Aggregates, Solutions, Ice water interface, Ice crystal growth, Ice crystal structure, Polarization (charge separation), Ion exchange, Adsorption

51-3985

Environmental factors and genotypic changes in lipids contribute to the winter hardiness of Norway spruce (*Picea abies*).

Wellburn, A.R., *New phytologist*, Jan. 1997, 135(1), p.115-121, 25 refs.

Trees (plants), Plant physiology, Cold weather survival, Cold tolerance, Plant tissues, Chemical properties, Correlation, Statistical analysis, Temperature effects

51-3986

Infectivity of the propagules associated with extraradical mycelia of two AM fungi following winter freezing.

Addy, H.D., Miller, M.H., Peterson, R.L., *New phytologist*, Apr. 1997, 135(4), p.745-753, 43 refs.

Soil microbiology, Ecosystems, Soil analysis, Roots, Fungi, Frost resistance, Cold weather tests, Cold weather survival, Freeze thaw tests, Viability

51-3987

GISP2 ice core is long, continuous and detailed record.

Twickler, M., *Witness the Arctic*, 1997, 5(1), p.1-2.

Climatology, Climatic changes, Pleistocene, Ice sheets, Ice cores, Sampling, Drill core analysis, Ice composition, Aerosols, Correlation, Greenland

51-3988

Identification of bomb-produced chlorine-36 in mid-latitude glacial ice of North America.

Cecil, L.D., Vogt, S., *Nuclear instruments & methods in physics research B*, Mar. 1997, 123(3-4), International Conference on Accelerator Mass Spectrometry, 7th, Tucson, AZ, May 20-24, 1996. Proceedings, p.287-289, 11 refs.

Fallout, Radioactive isotopes, Nuclear explosions, Detection, Hydrogeology, Radiation measurement, Isotope analysis, Ice cores, Isotope analysis, Correlation, United States—Wyoming—Upper Fremont Glacier

51-3989

First trans-Arctic ^{14}C section: comparison of the mean ages of the deep waters in the Eurasian and Canadian basins of the Arctic Ocean.

Schlosser, P., et al, *Nuclear instruments & methods in physics research B*, Mar. 1997, 123(3-4), International Conference on Accelerator Mass Spectrometry, 7th, Tucson, AZ, May 20-24, 1996. Proceedings, p.431-437, 25 refs.

Oceanographic surveys, Spectroscopy, Sea water, Radioactive age determination, Ocean currents, Carbon isotopes, Isotope analysis, Profiles, Statistical analysis, Arctic Ocean

51-3990
Using satellite data to reduce spatial extent of diagnosed icing.
Thompson, G., Bullock, R., Lee, T.F., *Weather and forecasting,* Mar. 1997, 12(1), p.185-190, 16 refs.
Aircraft icing, Ice forecasting, Weather forecasting, Humidity, Air temperature, Cloud height indicators, Cloud cover, Detection, Spaceborne photography, Radiometry, Models, Accuracy, Statistical analysis, Correlation

51-3991
Oil exploration in the Fylla area—an initial assessment of potential environmental impacts.
Mosbech, A., Dietz, R., Boertmann, D., Johansen, P., *Denmark. National Environmental Research Institute. Technical report,* Mar. 1996, No.156, 90p., With Danish summary. Refs. p.67-76.
Hydrocarbons, Marine geology, Offshore drilling, Petroleum industry, Exploration, Seismic surveys, Subpolar regions, Oil spills, Ecosystems, Cold weather operation, Icebergs, Environmental impact, Environmental protection, Countermeasures, Greenland—Fylla

51-3992
Measurement and computation of the moisture distribution in hydraulically bound base courses during attack by frost. [Messung und Berechnung der Feuchteverteilung in hydraulisch gebundenen Tragschichten bei Frostangriff]
Setzer, M.J., Ewinger, L., Auberg, R., *Forschung Straßenbau und Straßenverkehrstechnik,* 1996, Vol.721, p.1-62, In German with English and French summaries. 98 refs.
Cement admixtures, Concrete durability, Construction materials, Pavement bases, Frost resistance, Water content, Electrical measurement, Dielectric properties, Hygroscopic water, Freezing points, Saturation, Sands, Moisture transfer, Temperature effects

51-3993
Testing of the freeze-thaw resistance of hydraulically bound road bases. [Prüfung des Frostwiderstandes an hydraulisch gebundenen Tragschichten]
Setzer, M.J., Auberg, R., *Forschung Straßenbau und Straßenverkehrstechnik,* 1996, Vol.721, p.63-141, In German with English and French summaries. 43 refs.
Pavement bases, Cement admixtures, Cold weather tests, Frost resistance, Compressive properties, Freeze thaw tests, Water transport, Capillarity, Accuracy, Standards, Classifications

51-3994
Palaeoenvironmental study of Fairfax Lake, a small lake situated in the Rocky Mountain Foothills of west-central Alberta.
Hickman, M., Schweger, C.E., *Journal of paleolimnology,* 1991, 6(1), p.1-15, Refs. p.13-15.
Limnology, Paleoclimatology, Lacustrine deposits, Climatic changes, Drill core analysis, Paleoecology, Palynology, Nutrient cycle, Classifications, Radioactive age determination, Geochronology, Canada—Alberta—Fairfax Lake

51-3995
Coring tips.
Wright, H.E., Jr., *Journal of paleolimnology,* 1991, 6(1), p.37-49, 12 refs.
Limnology, Lacustrine deposits, Coring, Bottom sediment, Core samplers, Design, Performance, Pipes (tubes), Soil freezing, Artificial freezing, Dry ice (trademark)

51-3996
Freshwaters of Alaska—ecological synthesis.
Milner, A.M., ed, Oswood, M.W., ed, Ecological studies, Vol.119, New York, Springer-Verlag, 1996, 369p., Refs. passim. For selected papers see 51-3997 through 51-4004.
DLC QH105.A4 F74
Limnology, Subarctic landscapes, Arctic landscapes, Ecosystems, River flow, Stream flow, Hydrogeochemistry, Lake ice, Biomass, Glacier melting, Sampling, United States—Alaska

51-3997
Alaskan landscape: an introduction for limnologists.
Milner, A.M., Irons, J.G., III, Oswood, M.W., Freshwaters of Alaska—ecological syntheses. Ecological studies, Vol.119. Edited by A.M. Milner et al, New York, Springer-Verlag, 1996, p.1-44, Refs. p.41-44.
DLC QH105.A4 F74
Ecosystems, Surface waters, Wetlands, Limnology, Landscape types, Streams, River flow, Landscape types, River ice, Lake ice, Ice cover effect, Seasonal freeze thaw, Degree days, United States—Alaska

51-3998
History of limnology in Alaska: expeditions and major projects.
Hobbie, J.E., Freshwaters of Alaska—ecological syntheses. Ecological studies, Vol.119. Edited by A.M. Milner et al, New York, Springer-Verlag, 1996, p.45-60, 36 refs.
DLC QH105.A4 F74
Limnology, History, Subpolar regions, Exploration, Expeditions, Military research, Research projects, Ice surveys, Lake ice, Ecology, United States—Alaska

51-3999
Limnology of Toolik Lake.
O'Brien, W.J., et al, Freshwaters of Alaska—ecological syntheses. Ecological studies, Vol.119. Edited by A.M. Milner et al, New York, Springer-Verlag, 1996, p.61-106, Refs. p.102-106.
DLC QH105.A4 F74
Limnology, Arctic landscapes, Ecosystems, Watersheds, Hydrologic cycle, Snowmelt, Meltwater, Sedimentation, Plankton, Biomass, Classifications, Subglacial observations, Water chemistry, Seasonal variations, United States—Alaska—Toolik Lake

51-4000
Kuparuk River: a long-term study of biological and chemical processes in an arctic river.
Hershey, A.E., et al, Freshwaters of Alaska—ecological syntheses. Ecological studies, Vol.119. Edited by A.M. Milner et al, New York, Springer-Verlag, 1996, p.107-129, 41 refs.
DLC QH105.A4 F74
Rivers, Arctic landscapes, Ecosystems, River flow, River ice, Bottom ice, Ice cover effect, Tundra terrain, Geochemistry, Seasonal variations, Biomass, Geochemical cycles, Nutrient cycle, United States—Alaska—Kuparuk River

51-4001
Limnology of Smith Lake.
Alexander, V., Gu, B.H., Freshwaters of Alaska—ecological syntheses. Ecological studies, Vol.119. Edited by A.M. Milner et al, New York, Springer-Verlag, 1996, p.131-153, Refs. p.151-153.
DLC QH105.A4 F74
Limnology, Subarctic landscapes, Lake ice, Ice cover effect, Heat balance, Water temperature, Seasonal variations, Hydrogeochemistry, Ecosystems, Biomass, Nutrient cycle, United States—Alaska—Smith Lake

51-4002
Gold placer mining and stream ecosystems of interior Alaska.
LaPerriere, J.D., Reynolds, J.B., Freshwaters of Alaska—ecological syntheses. Ecological studies, Vol.119. Edited by A.M. Milner et al, New York, Springer-Verlag, 1996, p.265-280, 30 refs.
DLC QH105.A4 F74
Limnology, Streams, Subarctic landscapes, Alluvium, Sediment transport, Suspended sediments, Turbidity, Placer mining, Ecosystems, Environmental impact, United States—Alaska

51-4003
Glacial recession and freshwater ecosystems in coastal Alaska.
Milner, A.M., Freshwaters of Alaska—ecological syntheses. Ecological studies, Vol.119. Edited by A.M. Milner et al, New York, Springer-Verlag, 1996, p.303-330, Refs. p.328-330.
DLC QH105.A4 F74
Ecosystems, Limnology, Streams, Glacier ablation, Meltwater, Biomass, Migration, Vegetation patterns, United States—Alaska—Glacier Bay National Park

51-4004
Streams and rivers of Alaska: a high latitude perspective on running waters.
Oswood, M.W., Freshwaters of Alaska—ecological syntheses. Ecological studies, Vol.119. Edited by A.M. Milner et al, New York, Springer-Verlag, 1996, p.331-356, Refs. p.352-356.
DLC QH105.A4 F74
Surface waters, Tundra terrain, River flow, Stream flow, Limnology, Environmental impact, Ice cover effect, Ecology, Ecosystems, Biomass, Cold weather survival, Permafrost hydrology, Climatic changes, United States—Alaska

51-4005
Snow survey bulletin—April 1, 1995.
British Columbia. BC Environment. Water Management Division, Victoria, British Columbia, 1995, 48p.
Snow surveys, Snow cover distribution, Snow depth, Snow hydrology, Runoff forecasting, Seasonal variations, Water supply, Statistical analysis, Canada—British Columbia

51-4006
Geologic framework of a transect of the central Brooks Range: regional relations and an alternative to the Endicott Mountains allochthon.
Kelley, J.S., Brosgé, W.P., *AAPG bulletin,* Aug. 1995, 79(8), p.1087-1116, Refs. p.1113-1115.
Geological surveys, Tectonics, Pleistocene, Arctic landscapes, Geologic processes, Structural analysis, Quaternary deposits, Lithology, Stratigraphy, Geological maps, United States—Alaska—Brooks Range

51-4007
Thermal maturity of Lower Paleozoic sedimentary successions in arctic Canada.
Gentzis, T., De Freitas, T., Goodarzi, F., Melchin, M., Lenz, A., *AAPG bulletin,* July 1996, 80(7), p.1065-1084, Refs. p.1081-1083.
Marine geology, Quaternary deposits, Exploration, Geological surveys, Earth crust, Subsidence, Tectonics, Sedimentation, Hydrocarbons, Bitumens, Stratigraphy, Canada—Northwest Territories—Cornwallis Island, Canada—Northwest Territories—Ellesmere Island

51-4008
2140 cm^{-1} (4.673 microns) solid CO band: the case for interstellar O_2 and N_2 and the photochemistry of nonpolar interstellar ice analogs.
Elsila, J., Allamandola, L.J., Sandford, S.A., *Astrophysical journal,* Apr. 20, 1997, 479(2)pt.1, p.818-838, 79 refs.
Extraterrestrial ice, Ice physics, Cosmic dust, Ice optics, Ice detection, Ice composition, Infrared spectroscopy, Ice spectroscopy, Radiation absorption, Spectra, Photochemical reactions, Simulation

51-4009
Lidar measurements of middle and lower atmosphere properties during the LADIMAS campaign.
Philbrick, C.R., Lysak, D.B., Stevens, T.D., Haris, P.A.T., Rau, Y.C., European Space Agency, ESA SP-355 and ESA Symposium on European Rocket and Balloon Programmes and Related Research, 11th, Montreux, Switzerland, May 24-28, 1993. Proceedings, Paris, Mar. 1994, p.223-228, 19 refs.
Meteorological instruments, Lidar, Measuring instruments, Air temperature, Atmospheric physics

The results of the LAtitudinal DIstribution of Middle Atmosphere Structure (LADIMAS) experiment have provided a unique data set to improve the understanding of the middle atmosphere properties. The project included coordinated ship-board measurements between 70N and 65S and measurements at the Andoya rocket range to study the structure, dynamics and chemistry of the atmosphere. The cooperative study of the atmosphere was undertaken by researchers from several laboratories. Instruments were assembled aboard the German research vessel RV *Polarstern* while this vessel was sailing from the Arctic to the Antarctic between Oct. 8, 1991 and Jan. 2, 1992. An overview of the results from the PSU lidar investigation is presented here. (Auth. mod.)

51-4010

End of season report: Operation Deep Freeze 96/97.

U.S. Naval Support Force Antarctica, May 1997, var. p.

Research projects, Cold weather operation, Logistics, Military operation, Military facilities, Radio communication, Navigation, Transportation

This report describes the military support to the United States Antarctic Program (USAP) from Aug. 1996 to Mar. 1997 as Operation Deep Freeze 96/97. Support was provided by the Departments of Defense and Transportation under the operational control of Commander, U.S. Naval Support Force, Antarctica. The Naval Support Force Antarctica (NSFA) provided command and control facilities and medical services to McMurdo Station residents and the logistic and communications pipeline for resupply of the Terra Nova Bay Station and the Vostok Station. This report provides a summary of significant events during the operating period. The various organizations, units, and commands participating in Operation Deep Freeze 96/97 are listed, and their activities and recommendations are described.

51-4011

Global change and arctic terrestrial ecosystems.

Oechel, W.C., ed, et al, Ecological studies, Vol.124, New York, Springer-Verlag, 1997, 493p., Refs. passim. For selected papers see 51-4012 through 51-4033.

DLC QC981.8.C5G632 1997

Global warming, Atmospheric composition, Tundra climate, Tundra soils, Tundra vegetation, Vegetation patterns, Plant ecology, Nutrient cycle, Biomass

51-4012

Introduction. Challenges for the future: arctic and alpine ecosystems in a changing world.

Billings, W.D., Global change and arctic terrestrial ecosystems. Ecological studies, Vol.124. Edited by W.C. Oechel, et al, New York, Springer-Verlag, 1997, p.1-18, 53 refs.

DLC QC981.8.C5G632 1997

Tundra climate, Tundra vegetation, Plant ecology, Vegetation patterns, Acclimatization, Permafrost preservation, Permafrost forecasting, Thermokarst, Global warming

51-4013

Recent climate patterns in the Arctic.

Maxwell, B., Global change and arctic terrestrial ecosystems. Ecological studies, Vol.124. Edited by W.C. Oechel, et al, New York, Springer-Verlag, 1997, p.21-46, 19 refs.

DLC QC981.8.C5G632 1997

Polar atmospheres, Atmospheric composition, Atmospheric circulation, Global warming, Climatic changes, Sea ice distribution, Surface temperature, Precipitation (meteorology), Snow depth

51-4014

Quaternary environmental changes and ecosystems of the European Arctic.

Serebriannyĭ, L.R., Tishkov, A.A., Global change and arctic terrestrial ecosystems. Ecological studies, Vol.124. Edited by W.C. Oechel, et al, New York, Springer-Verlag, 1997, p.47-62, 13 refs.

DLC QC981.8.C5G632 1997

Tundra vegetation, Vegetation patterns, Plant ecology, Paleobotany, Palynology, Ecosystems, Paleoclimatology, Global change, Norway—Svalbard, Russia—Novaya Zemlya, Russia—Franz Josef Land

51-4015

Impact of hydrologic perturbations on arctic ecosystems induced by climate change.

Kane, D.L., Global change and arctic terrestrial ecosystems. Ecological studies, Vol.124. Edited by W.C. Oechel, et al, New York, Springer-Verlag, 1997, p.63-81, 28 refs.

DLC QC981.8.C5G632 1997

Polar atmospheres, Atmospheric circulation, Global warming, Tundra climate, Permafrost hydrology, Permafrost heat balance, Active layer, Snow hydrology, Snow heat flux, Snowmelt, Water balance

51-4016

Global and regional patterns of climate change: recent predictions for the Arctic.

Rowntree, P.R., Global change and arctic terrestrial ecosystems. Ecological studies, Vol.124. Edited by W.C. Oechel, et al, New York, Springer-Verlag, 1997, p.82-109, 31 refs.

DLC QC981.8.C5G632 1997

Polar atmospheres, Marine atmospheres, Atmospheric circulation, Atmospheric composition, Global warming, Climatic changes, Snowfall, Surface temperature, Precipitation (meteorology), Computerized simulation

51-4017

Photosynthesis and respiration in mosses and lichens.

Sveinbjörnsson, B., Sonesson, M., Global change and arctic terrestrial ecosystems. Ecological studies, Vol.124. Edited by W.C. Oechel, et al, New York, Springer-Verlag, 1997, p.113-128, 34 refs.

DLC QC981.8.C5G632 1997

Tundra vegetation, Lichens, Mosses, Plant ecology, Plant physiology, Photosynthesis, Biomass

51-4018

Impacts of climate change on demographic processes and population dynamics in arctic plants.

Callaghan, T.V., Carlsson, B.Å., Global change and arctic terrestrial ecosystems. Ecological studies, Vol.124. Edited by W.C. Oechel, et al, New York, Springer-Verlag, 1997, p.129-152, Refs. p.148-152.

DLC QC981.8.C5G632 1997

Tundra climate, Tundra vegetation, Vegetation patterns, Plant ecology, Plant physiology, Growth, Phenology, Acclimatization, Global warming, Climatic changes

51-4019

Phenology and reproductive success in arctic plants: susceptibility to climate change.

Molau, U., Global change and arctic terrestrial ecosystems. Ecological studies, Vol.124. Edited by W.C. Oechel, et al, New York, Springer-Verlag, 1997, p.153-170, 31 refs.

DLC QC981.8.C5G632 1997

Tundra climate, Tundra vegetation, Vegetation patterns, Plant ecology, Plant physiology, Phenology, Growth, Acclimatization, Global warming

51-4020

Kinetic approach to microbial ecology in arctic and boreal ecosystems in relation to global change.

Panikov, N.S., Global change and arctic terrestrial ecosystems. Ecological studies, Vol.124. Edited by W.C. Oechel, et al, New York, Springer-Verlag, 1997, p.171-188, 18 refs.

DLC QC981.8.C5G632 1997

Tundra climate, Tundra soils, Soil microbiology, Soil chemistry, Bacteria, Nutrient cycle, Plant ecology, Biomass, Mathematical models

51-4021

Impacts of global change on composition of arctic communities: implications for ecosystem functioning.

Chapin, F.S., III, Hobbie, S.E., Shaver, G.R., Global change and arctic terrestrial ecosystems. Ecological studies, Vol.124. Edited by W.C. Oechel, et al, New York, Springer-Verlag, 1997, p.221-228, 41 refs.

DLC QC981.8.C5G632 1997

Tundra climate, Tundra vegetation, Vegetation patterns, Plant ecology, Nutrient cycle, Biomass, Global warming

51-4022

Effect of climate change on biodiversity of arctic plants.

IUrtsev, B.A., Global change and arctic terrestrial ecosystems. Ecological studies, Vol.124. Edited by W.C. Oechel, et al, New York, Springer-Verlag, 1997, p.229-244, 40 refs.

DLC QC981.8.C5G632 1997

Tundra climate, Tundra vegetation, Vegetation patterns, Plant ecology, Biogeography, Global warming

51-4023

Climate change and future position of arctic tree line.

Scott, P.A., Lavoie, C., MacDonald, G.M., Sveinbjörnsson, B., Wein, R.W., Global change and arctic terrestrial ecosystems. Ecological studies, Vol.124. Edited by W.C. Oechel, et al, New York, Springer-Verlag, 1997, p.245-265, Refs. p.261-265.

DLC QC981.8.C5G632 1997

Forest lines, Forest tundra, Forest ecosystems, Trees (plants), Vegetation patterns, Revegetation, Plant ecology, Phenology, Paleobotany, Global warming

51-4024

Role of northern ecosystems in the global methane budget.

Vourlitis, G.L., Oechel, W.C., Global change and arctic terrestrial ecosystems. Ecological studies, Vol.124. Edited by W.C. Oechel, et al, New York, Springer-Verlag, 1997, p.266-289, Refs. p.284-289.

DLC QC981.8.C5G632 1997

Wetlands, Tundra soils, Soil chemistry, Soil air interface, Nutrient cycle, Geochemical cycles, Atmospheric composition, Global warming

51-4025

Responses of vegetation to past and future climate changes.

Huntley, B., Global change and arctic terrestrial ecosystems. Ecological studies, Vol.124. Edited by W.C. Oechel, et al, New York, Springer-Verlag, 1997, p.290-311, Refs. 307-311.

DLC QC981.8.C5G632 1997

Forest lines, Forest tundra, Tundra vegetation, Vegetation patterns, Revegetation, Plant ecology, Paleobotany, Paleoclimatology, Global warming

51-4026

Modeling the possible impact of climate change on broad-scale vegetation structure: examples from northern Europe.

Cramer, W., Global change and arctic terrestrial ecosystems. Ecological studies, Vol.124. Edited by W.C. Oechel, et al, New York, Springer-Verlag, 1997, p.312-329, 52 refs.

DLC QC981.8.C5G632 1997

Vegetation patterns, Revegetation, Plant ecology, Paleobotany, Biogeography, Paleoclimatology, Climatic changes, Global warming, Computerized simulation

51-4027

Past, present, and future potential sources contributing to artificial radionuclides in the arctic region.

Salbu, B., Strand, P., Global change and arctic terrestrial ecosystems. Ecological studies, Vol.124. Edited by W.C. Oechel, et al, New York, Springer-Verlag, 1997, p.330-345, 35 refs.

DLC QC981.8.C5G632 1997

Fallout, Radioactive wastes, Air pollution, Water pollution, Environmental impact, Barents Sea, Russia—Kara Sea

51-4028

Potential impacts of climate change on nutrient cycling, decomposition, and productivity in arctic ecosystems.

Nadelhoffer, K.J., Shaver, G.R., Giblin, A., Rastetter, E.B., Global change and arctic terrestrial ecosystems. Ecological studies, Vol.124. Edited by W.C. Oechel, et al, New York, Springer-Verlag, 1997, p.349-364, 43 refs.

DLC QC981.8.C5G632 1997

Tundra climate, Tundra vegetation, Tundra soils, Plant ecology, Litter, Soil microbiology, Decomposition, Nutrient cycle, Biomass, Global warming

51-4029

Buffering of arctic plant responses in a changing climate.

Jonasson, S., Global change and arctic terrestrial ecosystems. Ecological studies, Vol.124. Edited by W.C. Oechel, et al, New York, Springer-Verlag, 1997, p.365-380, 55 refs.

DLC QC981.8.C5G632 1997

Tundra climate, Tundra soils, Tundra vegetation, Vegetation patterns, Plant ecology, Acclimatization, Phenology, Nutrient cycle, Biomass, Grazing, Global warming

51-4030

Climate change in northern latitudes: alterations in ecosystem structure and function and effects on carbon sequestration.

Oechel, W.C., Vourlitis, G.L., Global change and arctic terrestrial ecosystems. Ecological studies, Vol.124. Edited by W.C. Oechel, et al, New York, Springer-Verlag, 1997, p.381-401, Refs. p.396-401.

DLC QC981.8.C5G632 1997

Tundra climate, Tundra soils, Tundra vegetation, Plant ecology, Biomass, Nutrient cycle, Soil air interface, Atmospheric composition, Global warming

51-4031

Phenomenological models of the primary productivity of zonal arctic ecosystems.

Gil'manov, T.G., Global change and arctic terrestrial ecosystems. Ecological studies, Vol.124. Edited by W.C. Oechel, et al, New York, Springer-Verlag, 1997, p.402-436, Refs. p.430-436.

DLC QC981.8.C5G632 1997

Tundra climate, Tundra soils, Tundra vegetation, Vegetation patterns, Plant ecology, Biomass, Nutrient cycle, Soil air interface, Atmospheric composition, Global warming, Mathematical models

51-4032

Analysis of CO_2, temperature, and moisture effects on carbon storage in Alaskan arctic tundra using a general ecosystem model.

Rastetter, E.B., McKane, R.B., Shaver, G.R., Nadelhoffer, K.J., Giblin, A., Global change and arctic terrestrial ecosystems. Ecological studies, Vol.124. Edited by W.C. Oechel, et al, New York, Springer-Verlag, 1997, p.437-451, 23 refs.

DLC QC981.8.C5G632 1997

Tundra climate, Tundra soils, Tundra vegetation, Plant ecology, Nutrient cycle, Soil air interface, Atmospheric composition, Global warming, Computerized simulation

51-4033

Century trends in the volume balance of boreal forests: implications for global CO_2 balance.

Auclair, A.N.D., Bedford, J.A., Global change and arctic terrestrial ecosystems. Ecological studies, Vol.124. Edited by W.C. Oechel, et al, New York, Springer-Verlag, 1997, p.452-472, Refs. p.468-472.

DLC QC981.8.C5G632 1997

Forest ecosystems, Forest land, Forest lines, Forest tundra, Taiga, Trees (plants), Plant ecology, Vegetation patterns, Biomass, Nutrient cycle, Global warming

51-4034

Effect of hypoxia and cold at rest on human thermoregulation.

Reading, J.E., Roberts, D.E., Hodgdon, J.A., Pozos, R.S., *U.S. Naval Health Research Center, San Diego, CA. Report,* 1996, No.96-14, 16p., 33 refs.

Cold exposure, Cold weather operation, Physiological effects, Health

51-4035

GER '97. Abstracts.

Geomatics in the Era of Radarsat, Ottawa, May 25-30, 1997, Ottawa, Canadian Institute of Geomatics, 1997, 488p., In English and French. Abstracts only.

Mapping, Terrain identification, Topographic surveys, Ice surveys, Ice conditions, Ice reporting, Glacier surveys, Snow surveys, Synthetic aperture radar, Spaceborne photography

51-4036

Long paleoclimate records from China.

Rutter, N.W., Ding, Z.L., Liu, T.S., *Geophysica,* 1996, 32(1-2), p.7-34, 56 refs.

Paleoclimatology, Climatic changes, Pleistocene, Loess, Quaternary deposits, Ice cores, Radioactive age determination, Wind factors, Wind velocity, Grain size, Stratigraphy, Magnetic resonance, Statistical analysis, Correlation, China

51-4037

Stratospheric ozone depletion and solar UV radiation in the Arctic and its potential impact on human health in Finland.

Taalas, P., et al, *Geophysica,* 1996, 32(1-2), p.127-165, Refs. p.160-165.

Climatology, Polar atmospheres, Stratosphere, Air temperature, Radio echo soundings, Temperature variations, Aerosols, Ozone, Degradation, Ultraviolet radiation, Snow cover effect, Environmental impact, Health, Finland

51-4038

Effects of environmental conditions and transport on surface ozone concentrations in Finland.

Laurila, T., *Geophysica,* 1996, 32(1-2), p.167-193, Refs. p.189-193.

Air pollution, Aerosols, Ozone, Atmospheric circulation, Subpolar regions, Sampling, Stratosphere, Degradation, Environmental impact, Sampling, Seasonal variations, Diurnal variations, Greenhouse effect, Finland

51-4039

Recent variations of atmospheric turbidity at selected sites in Finland, Estonia and Norway as revealed by surface solar radiation measurements.

Heikinheimo, M.J., et al, *Geophysica,* 1996, 32(1-2), p.195-215, 30 refs.

Climatology, Subpolar regions, Air pollution, Atmospheric composition, Aerosols, Turbidity, Photometry, Solar radiation, Atmospheric density, Transparence, Transmissivity, Environmental impact, Seasonal variations, Norway, Estonia, Finland

51-4040

Formation, growth, and properties of atmospheric aerosol particles and cloud droplets.

Kulmala, M., et al, *Geophysica,* 1996, 32(1-2), p.217-233, Refs. p.231-233.

Climatology, Cloud physics, Subpolar regions, Atmospheric composition, Aerosols, Particle size distribution, Cloud droplets, Homogeneous nucleation, Chemical analysis, Cloud cover, Optical properties, Models

51-4041

Statistical downscaling of monthly mean air temperature to the beginning of the flowering of snowdrops in northern Germany.

Maak, K., von Storch, H., *GKSS-Forschungszentrum Geesthacht G.m.b.H. Report,* 1996, GKSS-96/E/56, 11p., 11 refs.

Plants (botany), Phenology, Seasonal variations, Synoptic meteorology, Air temperature, Temperature variations, Temperature effects, Greenhouse effect, Statistical analysis, Correlation, Germany

51-4042

Normal modes of an ice sheet.

Hindmarsh, R.C.A., *Journal of fluid mechanics,* Mar. 25, 1997, Vol.335, p.393-413, 26 refs.

Ice sheets, Glacier flow, Ice mechanics, Rheology, Glacier mass balance, Glacier thickness, Oscillations, Statistical analysis, Mathematical models, Boundary value problems, Climatic factors

51-4043

Recent glacier variations in the Southern Patagonia Icefield, South America.

Aniya, M., Sato, H., Naruse, R., Skvarca, P., Casassa, G., *Arctic and alpine research,* Feb. 1997, 29(1), p.1-12, Refs. p.10-12.

Glacier oscillation, Glacier surveys, Spaceborne photography, Ice water interface, Calving, Glacier tongues, Ice volume, Glacier ablation, LANDSAT, Seasonal variations, Argentina—Patagonia, Chile—Patagonia

51-4044

Depositional history of the Younger Dryas-preboreal Búdi moraines in south-central Iceland.

Geirsdóttir, A., Hardardóttir, J., Eiríksson, J., *Arctic and alpine research,* Feb. 1997, 29(1), p.13-23, 53 refs.

Pleistocene, Glacial geology, Glacial deposits, Moraines, Glacier oscillation, Sedimentation, Lake bursts, Stratigraphy, Sea level, Calving, Lithology, Radioactive age determination, Iceland

51-4045

Early Holocene trace metal enrichment in organic lake sediments, Baffin Island, arctic Canada.

Wolfe, A.P., Härtling, J.W., *Arctic and alpine research,* Feb. 1997, 29(1), p.24-31, 31 refs.

Limnology, Lacustrine deposits, Quaternary deposits, Arctic landscapes, Sedimentation, Paleoecology, Hydrogeochemistry, Stratigraphy, Metals, Microanalysis, Diagenesis, Drill core analysis, Radioactive age determination, Canada—Northwest Territories—Baffin Island

51-4046

Growth and vegetation history of alpine mires on the Old Man Range, central Otago, New Zealand.

McGlone, M.S., Moar, N.T., Meurk, C.D., *Arctic and alpine research,* Feb. 1997, 29(1), p.32-44, 25 refs.

Paleoclimatology, Paleoecology, Climatic changes, Alpine landscapes, Swamps, Vegetation patterns, Peat, Profiles, Coring, Palynology, Stratigraphy, Radioactive age determination, New Zealand—Otago

51-4047

Late Quaternary vegetation history of White Pass, northern British Columbia, Canada.

Spear, R.W., Cwynar, L.C., *Arctic and alpine research,* Feb. 1997, 29(1), p.45-52, 30 refs.

Paleoecology, Lacustrine deposits, Quaternary deposits, Palynology, Vegetation patterns, Migration, Tundra vegetation, Forest lines, Radioactive age determination, Correlation, Canada—British Columbia—White Pass

51-4048

Late Quaternary paleoenvironments of the White River Plateau, Colorado, U.S.A.

Feiler, E.J., Anderson, R.S., Koehler, P.A., *Arctic and alpine research,* Feb. 1997, 29(1), p.53-62, 47 refs.

Paleoclimatology, Paleoecology, Glacial geology, Glacial deposits, Quaternary deposits, Precipitation (meteorology), Meadow soils, Soil analysis, Vegetation patterns, Palynology, Radioactive age determination, Stratigraphy, Profiles, United States—Colorado—White River Plateau

51-4049

Early Weichselian insect faunas from northern Sweden: climatic and environmental implications.

Lemdahl, G., *Arctic and alpine research,* Feb. 1997, 29(1), p.63-74, 59 refs.

Paleoecology, Pleistocene, Climatic changes, Quaternary deposits, Vegetation patterns, Tundra soils, Classifications, Moraines, Coring, Scanning electron microscopy, Radioactive age determination, Correlation, Sweden

51-4050

Relationship between diatoms and water temperature in thirty subarctic Fennoscandian lakes.

Weckström, J., Korhola, A., Blom, T., *Arctic and alpine research,* Feb. 1997, 29(1), p.75-92, Refs. p.84-87.

Limnology, Subarctic landscapes, Lacustrine deposits, Vegetation patterns, Ecosystems, Plankton, Water temperature, Surface temperature, Temperature effects, Sampling, Statistical analysis, Correlation, Fennoscandia

51-4051

Shifts in mycorrhiza and microbial activity along an oroarctic altitudinal gradient in northern Fennoscandia.

Väre, H., Vestberg, M., Ohtonen, R., *Arctic and alpine research*, Feb. 1997, 29(1), p.93-104, Refs. p.102-104.

Soil microbiology, Subarctic landscapes, Roots, Fungi, Plant ecology, Sampling, Soil analysis, Ecosystems, Altitude, Vegetation patterns, Statistical analysis, Fennoscandia

51-4052

Soil characteristics of 48-year-old borrow pits and vehicle tracks in shrub tundra long the CANOL No. 1 pipeline corridor, Northwest Territories, Canada.

Harper, K.A., Kershaw, G.P., *Arctic and alpine research*, Feb. 1997, 29(1), p.105-111, 36 refs.

Tundra soils, Tundra vegetation, Damage, Ecosystems, Soil formation, Substrates, Soil analysis, Soil temperature, Organic soils, Vegetation patterns, Environmental impact, Microclimatology, Statistical analysis, Canada—Northwest Territories

51-4053

Sensitivity of timberline flora in Kumaun Himalaya, India: conservation implications.

Rawal, R.S., Dhar, U., *Arctic and alpine research*, Feb. 1997, 29(1), p.112-121, Refs. p.117-118.

Mountains, Alpine landscapes, Forest lines, Forest ecosystems, Sampling, Vegetation patterns, Distribution, Classifications, Environmental protection, Statistical analysis, India—Himalaya Mountains

51-4054

Temperature adaptation and acclimation potential of leaf dark respiration in two species of *Ranunculus* from warm and cold habitats.

Arnone, J.A., III, Körner, C., *Arctic and alpine research*, Feb. 1997, 29(1), p.122-125, 28 refs.

Plants (botany), Alpine landscapes, Air temperature, Temperature variations, Temperature effects, Global warming, Simulation, Plant physiology, Acclimatization, Plant tissues, Statistical analysis, Thermal regime

51-4055

Community of snow algae on a Himalayan glacier: change of algal biomass and commmunity structure with altitude.

Yoshimura, Y., Kohshima, S., Ohtani, S., *Arctic and alpine research*, Feb. 1997, 29(1), p.126-137, 30 refs.

Glacial hydrology, Ecosystems, Plant ecology, Algae, Biomass, Classifications, Snow surface, Glacier surfaces, Substrates, Sampling, Altitude, Microclimatology, China—Yala Glacier

51-4056

Issues in stratospheric ozone depletion.

Lloyd, S.A., Cambridge, Harvard University, 1993, 351p., University Microfilms order No. 94-21961, Ph.D. thesis. 44 refs.

Ozone, Atmospheric composition, Simulation, Stratosphere, Ultraviolet radiation, Physiological effects, Health

Following the announcement of the discovery of the antarctic ozone hole in 1985 there have arisen a multitude of questions pertaining to the nature and consequences of polar ozone depletion. This thesis addresses several of these specific questions, using both computer models of chemical kinetics and the Earth's radiation field as well as laboratory kinetic experiments. A coupled chemical kinetic-radiative numerical model was developed to assist in the analysis of *in situ* field measurements of several radical and neutral species in the polar and mid-latitude lower stratosphere. Such modeling was instrumental in establishing the link between the observed ClO and BrO concentrations in the antarctic polar vortex and the observed rate of ozone depletion. The principal medical concern of stratospheric ozone depletion is that ozone loss will lead to the enhancement of ground-level UV-B radiation. Global ozone climatology was incorporated into a radiation field model to calculate the biologically accumulated dosage (BAD) of UV-B radiation, integrated over days, months, and years. The slope of the annual BAD as a function of latitude was found to correspond to epidemiological data for non-melanoma skin cancers.

51-4057

Changing composition of the atmosphere.

Manning, M.R., Pearman, G.I., Etheridge, D.M., Fraser, P.J., Lowe, D.C., Steele, L.P., Greenhouse: coping with climate change. Edited by W.J. Bouma, G.I. Pearman and M.R. Manning, Collingwood, CSIRO Australia, 1996, p.3-26, Refs. p.22-26.

DLC QC981.8.C5G728 1996

Atmospheric composition, Air pollution, Ozone, Greenhouse effect

This paper reviews changes that have occurred in the atmospheric levels of major greenhouse gases and consequent changes to heating of the lower atmosphere through the enhanced greenhouse effect. Ozone is a greenhouse gas which is produced by chemical reactions in the atmosphere. Emissions of CFCs have decreased ozone in the stratosphere, whereas emissions of nitrogen oxides and volatile organic compounds have increased ozone in the troposphere, at least in the Northern Hemisphere. Global atmospheric chemistry models indicate that changes in ozone over the last 200 years have probably contributed more to the enhanced greenhouse effect than changes in nitrous oxide or CFCs. (Auth. mod.)

51-4058

Past climatic change in Oceania and Antarctica.

McGlone, M., Hope, G., Chappell, J., Barrett, P., Greenhouse: coping with climate change. Edited by W.J. Bouma, G.I. Pearman and M.R. Manning, Collingwood, CSIRO Australia, 1996, p.81-99, Refs. p.96-99.

DLC QC981.8.C5G728 1996

Paleoclimatology, Climatic changes, Air temperature, Atmospheric composition, Ice melting, Sea level, Sea ice

Long climate records from deep sea sediments and polar ice caps show that the last few million years have been dominated by quasi-regular glacial-interglacial cycles. The current climatic regime that established between 3000 and 2000 years ago is highly variable. High resolution records show some decades and centuries have had higher or lower than average numbers of warmer or wetter years, but there have been no sustained periods of highly deviant climate. The warming of recent decades is an unusual event as shown by the long-term perspective of these records. Palaeorecords show the antarctic region to be highly sensitive to warming and, with future warming, sea ice extent could be dramatically reduced. On a much longer timescale, the unstable West Antarctic Ice Sheet could be vulnerable to collapse because of the effects of rising sea levels. (Auth. mod.)

51-4059

Ocean processes, climate and sea level.

Rintoul, S., Meyers, G., Church, J., Godfrey, S., Moore, M., Stanton, B., Greenhouse: coping with climate change. Edited by W.J. Bouma, G.I. Pearman and M.R. Manning, Collingwood, CSIRO Australia, 1996, p.127-144, Refs. p.142-144.

DLC QC981.8.C5G728 1996

Ocean currents, Air water interactions, Climatic changes, Greenhouse effect, Sea level

The oceans store and transport vast quantities of heat, water and carbon. As a consequence, the rate and regional distribution of climate change on time scales longer than months is dominated by ocean processes. Changes in ocean circulation can have a strong impact on regional climate. Sea surface temperature variations in the Pacific and Indian oceans, for example, are correlated with Australian rainfall. Sea surface temperature is, in turn, sensitive to changes in ocean circulation. Recent improvements in the correction of tide gauge observations for land motion has resulted in a consistent record of historical sea-level rise. Forecasts of future sea-level rise due to thermal expansion of the ocean have been improved by taking into account the fact that heat enters the ocean primarily by advection rather than diffusion. Effects of changes in the formation rate and transport of Antarctic Intermediate Water are discussed. (Auth. mod.)

51-4060

Vertical distribution of bacteria in Arctic sea ice from the Barents and Laptev Seas.

Gradinger, R., Zhang, Q., *Polar biology*, May 1997, 17(5), p.448-454, Refs. p.453-454.

Bacteria, Biomass, Distribution, Sea ice

51-4061

Climate of Europe 6000 years ago.

Cheddadi, R., Yu, G., Guiot, J., Harrison, S.P., Prentice, I.C., *Climate dynamics*, Dec. 1996, 13(1), p.1-9, 33 refs.

Paleoclimatology, Palynology, Lake water, Water level, Air temperature, Moisture transfer, Climatic changes, Mathematical models, Simulation, Correlation, Geochronology

51-4062

Sensitivity of a Greenland ice sheet model to ice flow and ablation parameters: consequences for the evolution through the last climatic cycle.

Ritz, C., Fabre, A., Letréguilly, A., *Climate dynamics*, Dec. 1996, 13(1), p.11-24, 48 refs.

Climatology, Climatic changes, Ice sheets, Topographic features, Glacier thickness, Glacier oscillation, Glacier flow, Glacier ablation, Glacier mass balance, Simulation, Mathematical models, Periodic variations, Greenland

51-4063

Modelled atmospheric response to changes in northern hemisphere snow cover.

Walland, D.J., Simmonds, I., *Climate dynamics*, Dec. 1996, 13(1), p.25-34, 31 refs.

Climatology, Climatic changes, Atmospheric boundary layer, Snow cover distribution, Snow air interface, Snow cover effect, Air temperature, Temperature variations, Atmospheric circulation, Simulation, Mathematical models

51-4064

Downscaling of general circulation model outputs: simulation of the snow climatology of the French Alps and sensitivity to climate change.

Martin, E., Timbal, B., Brun, E., *Climate dynamics*, Dec. 1996, 13(1), p.45-56, 21 refs.

Climatology, Climatic changes, Atmospheric circulation, Air flow, Snow air interface, Snow cover distribution, Snow depth, Meteorological factors, Simulation, Seasonal variations, France—Alps

51-4065

Influence of the temperate and boreal forests on the northern hemisphere climate in the Météo-France climate model.

Douville, H., Royer, J.F., *Climate dynamics*, Dec. 1996, 13(1), p.57-74, Refs. p.72-74.

Climatology, Climatic changes, Atmospheric boundary layer, Heat flux, Radiation balance, Albedo, Snow cover effect, Snowmelt, Runoff, Forest land, Vegetation patterns, Vegetation factors, Simulation, Mathematical models

51-4066

Atmospheric winter circulation during the Younger Dryas stadial in the Atlantic/European sector.

Renssen, H., Lautenschlager, M., Schuurmans, C.J.E., *Climate dynamics*, Nov. 1996, 12(12), p.813-824, 33 refs.

Pleistocene, Paleoclimatology, Atmospheric circulation, Air temperature, Cooling, Surface temperature, Atmospheric pressure, Wind direction, Fronts (meteorology), Sea ice distribution, Ice cover effect, Simulation, Periodic variations, Atlantic Ocean

51-4067

Interannual variability and predictability in an ensemble of AMIP climate simulations conducted with CCC GCM2.

Zwiers, F.W., *Climate dynamics*, Nov. 1996, 12(12), p.825-847, 40 refs.

Climatology, Climatic changes, Surface temperature, Atmospheric boundary layer, Air temperature, Sea ice distribution, Ice cover effect, Simulation, Mathematical models, Statistical analysis, Seasonal variations, Correlation, Long range forecasting

51-4068

High frequency pulses of East Asian monsoon climate in the last two glaciations: link with the North Atlantic.

Guo, Z., et al, *Climate dynamics*, Sep. 1996, 12(10), p.701-709, 55 refs.

Pleistocene, Paleoclimatology, Climatic changes, Loess, Quaternary deposits, Weathering, Stratigraphy, Precipitation (meteorology), Glaciation, Icebergs, Correlation, Indexes (ratios), Radioactive age determination, China

51-4069

Second Hadley Centre coupled ocean-atmosphere GCM: model description, spinup and validation.

Johns, T.C., et al, *Climate dynamics,* Feb. 1997, 13(2), p.103-134, Refs. p.132-134.

Climatology, Climatic changes, Sea ice distribution, Air ice water interaction, Air temperature, Ice cover effect, Ice heat flux, Seasonal variations, Temperature variations, Simulation, Mathematical models

This study describes a new coupled ocean-atmosphere general circulation model (OAGCM) developed for studies of climate change and results from a hindcast experiment. The model includes various physical and technical improvements relative to an earlier version of the Hadley Centre OAGCM. Including sea ice advection and enhancing reference surface salinities in antarctic latitudes in austral winter to promote bottom water formation during spinup appears to have stabilized the high-latitude drift exhibited in the earlier model's control run. These allow validation of the model against the instrumental climate record. Inclusion of aerosol forcing gives a significantly better simulation of historical temperature patterns, although comparisons against recent sea ice trends are equivocal. These studies emphasize the potential importance of including additional forcing terms apart from greenhouse gases in climate simulations, and refining estimates of their spatial distribution and magnitude. (Auth. mod.)

51-4070

Performance of the OPA/ARPEGE-T21 global ocean-atmosphere coupled model.

Guilyardi, E., Madec, G., *Climate dynamics,* Feb. 1997, 13(2), p.149-165, 56 refs.

Climatology, Air temperature, Surface temperature, Heat flux, Meteorological factors, Sea ice distribution, Ice melting, Ice cover effect, Air ice water interaction, Simulation, Mathematical models

The climatology of the OPA/ARPEGE-T21 coupled general circulation model (GCM) is presented. The mean state and seasonal cycle for the last 10 years of the experiment are described and compared to the corresponding uncoupled experiments and to climatology when available. The model reasonably simulates most of the basic features of the observed climate. Energy budgets and transports in the coupled system, of importance for climate studies, are assessed and prove to be within available estimates. After an adjustment phase of a few years, the model stabilizes around a mean state where the tropics are warm and resemble a permanent ENSO, the southern ocean warms and almost no sea-ice is left in Antarctica. The stability of the model is shown to be related to qualities already present in the uncoupled GCMs used, namely a balanced radiation budget at the top-of-the-atmosphere and a tight ocean thermocline. (Auth. mod.)

51-4071

On the dating of Pleistocene deposits by means of pollen analysis. [Über die Datierung pleistozäner Ablagerungen mit Hilfe von Pollenanalysen]

Grüger, E., *Eclogae geologicae Helvetiae,* 1996, 89(3), Société paléontologique suisse. 75e Assemblée annuelle. Compte rendu, p.977-990, In German with English summary. 47 refs.

Pleistocene, Paleoecology, Vegetation patterns, Quaternary deposits, Sediments, Palynology, Classifications, Statistical analysis, Age determination, Correlation

51-4072

Introduction of the Haslach glacial period and the tripartition of Riss glacial period in the eastern Rhine-Glacier area. [Die Einführung der Haslacheiszeit und dei 3-Teilung der Risseiszeit im östlichen Rheingletschergebiet (SW-Deutschland)]

Schreiner, A., *Eclogae geologicae Helvetiae,* 1996, 89(3), Société paléontologique suisse. 75e Assemblée annuelle. Compte rendu, p.991-1005, In German with English summary. 47 refs.

Pleistocene, Glacial geology, Alpine glaciation, Quaternary deposits, Glacier oscillation, Moraines, Gravel, Stratigraphy, Glacial erosion, Palynology, Age determination, Correlation, Germany—Rhine Glacier

51-4073

Considerations on the motion mechanism of advancing Pleistocene glaciers and on glacial erosion and overdeepening. [Überlegungen zum Bewegungsmechanismus vorstoßender kaltzeitlicher Gletscher und zur glazialen Erosion und Übertiefung]

Habbe, K.A., *Eclogae geologicae Helvetiae,* 1996, 89(3), Société paléontologique suisse. 75e Assemblée annuelle. Compte rendu, p.1007-1022, In German with English summary. 26 refs.

Pleistocene, Quaternary deposits, Glacial geology, Glacial hydrology, Alpine glaciation, Glacier flow, Glacial erosion, Geomorphology, Ice push, Ice mechanics, Glacier melting, Meltwater, Subglacial drainage

51-4074

Exposure age of an Egesen moraine at Julier Pass, Switzerland, measured with the cosmogenic radionuclides ^{10}Be, ^{26}Al and ^{36}Cl.

Ivy-Ochs, S., Schlüchter, C., Kubik, P.W., Synal, H.A., Beer, J., Kerschner, H., *Eclogae geologicae Helvetiae,* 1996, 89(3), Société paléontologique suisse. 75e Assemblée annuelle. Compte rendu, p.1049-1063, With German summary. 57 refs.

Pleistocene, Paleoclimatology, Climatic changes, Glacial geology, Alpine glaciation, Moraines, Quaternary deposits, Gamma irradiation, Spectroscopy, Radioactive age determination, Geochronology, Correlation, Switzerland—Egesen

51-4075

Last glacial ice-tectonics in the Weisstannental (SG, Switzerland): ice-mechanic and climatostratigraphic implications. [Letzteiszeitliche Glazitektonik im Weisstannental (SG): Eismechanische und klimatostratigraphische Implikationen]

Müller, B.U., *Eclogae geologicae Helvetiae,* 1996, 89(3), Société paléontologique suisse. 75e Assemblée annuelle. Compte rendu, p.1065-1075, In German with English summary. 19 refs.

Alpine glaciation, Pleistocene, Quaternary deposits, Moraines, Stratigraphy, Profiles, Glacier oscillation, Paleoclimatology, Climatic changes, Glacial geology, Glacier oscillation, Tectonics, Switzerland—Sargans

51-4076

Ice-dammed marginal sediments of the Rhine Glacier in the Schanfigg valley (Graubünden, Switzerland). [Stausedimente am Rande des Rheingletscher-Eisstromnetzes im Schanfigg (Graubünden)]

Keller, O., *Eclogae geologicae Helvetiae,* 1996, 89(3), Société paléontologique suisse. 75e Assemblée annuelle. Compte rendu, p.1093-1103, In German with English summary. 23 refs.

Alpine glaciation, Pleistocene, Glacial deposits, Glacial geology, Geomorphology, Sedimentation, Profiles, Ice dams, Glacial erosion, Quaternary deposits, Switzerland—Rhine Glacier

51-4077

Late glacial back-melting marks of the alpine icestream network (Rhine-Glacier, Würm). [Rückschmelzmarken des alpinen Eisstromnetzes im Spätglazial (Rheingletscher-System, Würm)]

Krayss, E., *Eclogae geologicae Helvetiae,* 1996, 89(3), Société paléontologique suisse. 75e Assemblée annuelle. Compte rendu, p.1105-1113, In German with English summary. 22 refs.

Alpine glaciation, Pleistocene, Geomorphology, Glacial geology, Landforms, Moraines, Glacier melting, Meltwater, Water erosion, Radioactive age determination, Geochronology, Correlation, Switzerland

51-4078

ECBILT—a coupled atmosphere ocean sea-ice model for climate predictability studies.

Haarsma, R.J., Selten, F.M., Opsteegh, J.D., Lenderink, G., Liu, Q., *Koninklijk Nederlands Meteorologisch Instituut. Technical report,* 1996, No.195, 31p., 24 refs.

Climatology, Hydrologic cycle, Marine atmospheres, Air ice water interaction, Sea ice distribution, Ice cover effect, Moisture transfer, Solar radiation, Heat flux, Wind factors, Convection, Seasonal variations, Simulation, Mathematical models, Weather forecasting

51-4079

Structural instability in ice VIII under pressure.

Besson, J.M., Klotz, S., Hamel, G., *Physical review letters,* Apr. 21, 1997, 78(16), p.3141-3144, 21 refs.

Ice physics, Deuterium oxide ice, High pressure ice, High pressure tests, Ice structure, Molecular structure, Neutron scattering, Spectra, Vibration, Stability, Phase transformations

51-4080

Two dimensional ice adsorbed on mica surface.

Odelius, M., Bernasconi, M., Parrinello, M., *Physical review letters,* Apr. 7, 1997, 78(14), p.2855-2858, 25 refs.

Ice physics, Water structure, Ice solid interface, Adsorption, Hydrogen bonds, Molecular structure, Monomolecular films, Ice nuclei, Two dimensional nucleation, Stability, Simulation, Ion exchange

51-4081

Smoothing of deuterium-tritium ice by electrical heating of the saturated vapor.

Mapoles, E.R., Sater, J., Pipes, J., Monsler, E., *Physical review E,* Mar. 1997, 55(3)B, p.3473-3480, 17 refs.

Ice physics, Cryogenics, Ice vapor interface, Ice formation, Layers, Ice surface, Surface roughness, Microwaves, Electric fields, Electric heating, Heat flux, Gases, Thermal analysis

51-4082

Quaternary glacier-dammed lakes in the mountains of Siberia.

Grosval'd, M.G., Rudoĭ, A.N., *Polar geography,* July-Sep. 1996, 20(3), p.180-198, Translated from Akademiia nauk. Izvestiia. Seria geograficheskaya. 27 refs.

Glacial hydrology, Geomorphology, Mountains, Terraces, Glacial lakes, Ice dams, Lake bursts, Water erosion, Landscape development, Russia—Siberia

51-4083

Thermal and freshwater springs of the Chukchi Peninsula: unique subarctic ecosystems. Part II. Flora.

Vekhov, N.V., *Polar geography,* July-Sep. 1996, 20(3), p.209-220, Translated from Geografiia i prirodnye resursy. 11 refs.

Ecosystems, Plant ecology, Subarctic landscapes, Vegetation patterns, Classifications, Springs (water), Distribution, Russia—Chukchi Peninsula

51-4084

Nonwoody taiga vegetation in the Kirenga River basin (northern Cisbaykalia) and its transformation by oil and gas development.

Garashchenko, A.V., *Polar geography,* July-Sep. 1996, 20(3), p.221-229, Translated from Geografiia i prirodnye resursy. 5 refs.

Subpolar regions, Plant ecology, Taiga, Ecosystems, Vegetation patterns, Hydrocarbons, Petroleum industry, Environmental impact, Environmental protection, Russia—Siberia

51-4085

Observations of ice nucleation and propagation in plants using infrared video thermography.

Wisniewski, M., Lindow, S.E., Ashworth, E.N., *Plant physiology,* Feb. 1997, 113(2), p.327-334, 36 refs.

Plant physiology, Plant tissues, Infrared photography, Ice formation, Heterogeneous nucleation, Bacteria, Ice nuclei, Phase transformations, Temperature variations, Ice detection, Resolution

51-4086

Use of passive microwave and optical data for large-scale snow-cover mapping.

Salomonson, V.V., Hall, D.K., Chien, J.Y.L., Topical Symposium on Combined Optical-Microwave Earth and Atmosphere Sensing, 2nd, Atlanta, GA, Apr. 3-6, 1995. Proceedings, Piscataway, Institute of Electrical and Electronics Engineers, 1994, p.35-37, 7 refs.

DLC G70.39.T67

Snow surveys, Sensor mapping, Snow cover distribution, Spaceborne photography, Microwaves, Radiometry, Snow line, Seasonal variations

51-4087

Remote sensing of tropospheric clouds with a dual polarization radar.

Scott, R., Chen, T.H., Krehbiel, P., Topical Symposium on Combined Optical-Microwave Earth and Atmosphere Sensing, 2nd, Atlanta, GA, Apr.3-6, 1995. Proceedings, Piscataway, Institute of Electrical and Electronics Engineers, 1994, p.132-134, 6 refs.

DLC G70.39.T67

Precipitation (meteorology), Clouds (meteorology), Remote sensing, Radar echoes, Ice detection, Polarization (waves), Ice dielectrics, Electric fields, Ice crystal structure, Orientation, Cloud electrification

51-4088

Estimation of surface snow properties using combined near-infrared reflectance and millimeter-wave backscatter.

Narayanan, R.M., Jackson, S.R., St. Germain, K.M., Topical Symposium on Combined Optical-Microwave Earth and Atmosphere Sensing, 2nd, Atlanta, GA, Apr.3-6, 1995. Proceedings, Piscataway, Institute of Electrical and Electronics Engineers, 1994, p.189-191, 5 refs.

DLC G70.39.T67

Snow surveys, Snow cover structure, Remote sensing, Snow water content, Grain size, Surface roughness, Backscattering, Microwaves, Reflectivity, Polarization (waves), Snow optics

51-4089

Measurement techniques and capabilities of the GEOSAT follow-on (GFO) radar altimeter.

Walker, D.M., Topical Symposium on Combined Optical-Microwave Earth and Atmosphere Sensing, 2nd, Atlanta, GA, Apr.3-6, 1995. Proceedings, Piscataway, Institute of Electrical and Electronics Engineers, 1994, p.226-228, 8 refs.

DLC G70.39.T67

Remote sensing, Oceanography, Geophysical surveys, Ice surveys, Sea ice distribution, Spacecraft, Radar echoes, Height finding, Sensor mapping, Military equipment, Design

51-4090

Mount Pinatubo eruption: effects on the atmosphere and climate.

Fiocco, G., ed, Fuà, D., ed, Visconti, G., ed, North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I: Global Environmental Change, Vol.42, Berlin, Springer-Verlag, 1996, 310p., Refs. passim. Proceedings of the NATO Advanced Research Workshop on the Effects of the Mount Pinatubo Eruption on the Atmosphere and Climate, Rome, Italy, Sep. 26-30, 1994. For selected papers see I-57436 through I-57439 or 51-4091 through 51-4093.

DLC QC981.8.V65N38 1996

Aerosols, Air pollution, Atmospheric composition, Ozone, Lidar, Polar stratospheric clouds, Volcanic ash, Antarctica—Amundsen-Scott Station

The book contains a collection of papers presented at the NATO Advanced Research Workshop on "The Effects of the Mt. Pinatubo Eruption on the Atmosphere and Climate", held in Rome, Italy on Sep. 26-30, 1994. Four of the papers are pertinent to Antarctica.

51-4091

Evolution of the Pinatubo stratospheric aerosol layer observed by lidar at South Pole, Rome, Thule: a summary of results.

Fiocco, G., et al, Mount Pinatubo eruption: effects on the atmosphere and climate. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I: Global Environmental Change, Vol.42. Edited by G. Fiocco, D. Fuà and G. Visconti, Berlin, Springer-Verlag, 1996, p.17-32, 12 refs.

DLC QC981.8.V65N38 1996

Aerosols, Air pollution, Atmospheric composition, Ozone, Lidar, Polar stratospheric clouds, Volcanic ash, Antarctica—Amundsen-Scott Station

Stratospheric aerosol observations have been carried out with 3 lidars, in the period preceding and following the eruption of Mt. Pinatubo. The lidars were located at South Pole, Rome and Thule. The detailed analysis of the results is still under way: their general features and highlights are summarized in this paper. The aerosol backscattering data show the global evolution of the volcanic aerosol cloud in relation to the general circulation of the atmosphere and to microphysical processes. Other inferred parameters are the mass, the center of mass of the cloud, and the size distribution of the aerosol. Correlations between the aerosol and the ozone contents, found after all main eruptions since 1962, have been confirmed. Large effects on polar stratospheric cloud activity have been recorded. (Auth.)

51-4092

Evolution of the Mt. Pinatubo volcanic cloud and analysis of its effect on the ozone amount as observed from ground-based measurements performed in northern and southern latitudes.

Godin, S., David, C., Guirlet, M., Mount Pinatubo eruption: effects on the atmosphere and climate. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I: Global Environmental Change, Vol.42. Edited by G. Fiocco, D. Fuà and G. Visconti, Berlin, Springer-Verlag, 1996, p.143-159, Refs. p.158-159.

DLC QC981.8.V65N38 1996

Air pollution, Aerosols, Ozone, Atmospheric composition, Atmospheric circulation, Polar stratospheric clouds, Climatology, Antarctica—Dumont d'Urville Station

The decay of the Mt. Pinatubo volcanic cloud was monitored by systematic ground-based aerosol lidar systems implemented at the Observatoire de Haute-Provence and at the antarctic Dumont d'Urville Station. Additional backscatter lidar measurements were also performed during the EASOE campaign in Sodankylä. The analysis of the aerosol measurements obtained at the northern and southern polar latitudes shows that mixing can take place at the edge of the polar vortex in the lower stratosphere whereas the vortex remains mainly isolated above, especially in the Southern Hemisphere. The measurements performed in the winter and spring of 1992 at Dumont d'Urville allow one to evaluate the subsidence of air inside the vortex, at a rate of 1 km/month at the 475 K potential temperature level. (Auth. mod.)

51-4093

Observations and interpretation of changes in stratospheric ozone following the Pinatubo eruption.

Hofmann, D.J., Solomon, S., Mount Pinatubo eruption: effects on the atmosphere and climate. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I: Global Environmental Change, Vol.42. Edited by G. Fiocco, D. Fuà and G. Visconti, Berlin, Springer-Verlag, 1996, p.177-188, 19 refs.

DLC QC981.8.V65N38 1996

Ozone, Air pollution, Volcanic ash, Atmospheric composition, Aerosols, Antarctica—Amundsen-Scott Station

Following the eruption of Mt. Pinatubo, substantial decreases were observed both in ozonesonde and total column ozone observations. These decreases are illustrated with data from mid-latitudes and polar regions (at the Amundsen-Scott Station), and are interpreted in terms of heterogeneous chemical processes, both involving hydrolysis of dinitrogen pentoxide and reactions involving chlorine species such as $ClONO_2$, HOCl, and HCl on sulfate aerosols. In addition, this paper shows in detail for the first time how the ozone budget varies with altitude in response to sulfate aerosol perturbations, revealing the reasons for observed increases in ozone above about 25 km following the eruption. It is suggested that the possible effect of volcanic aerosol on ozone in Antarctica will be felt mainly in the lower stratosphere because of subsidence of the aerosol layer in the vortex during winter. (Auth. mod.)

51-4094

Avalanches of the Swiss Alps. [Die Lauinen der Schweizeralpen]

Coaz, J., Bern, Switzerland, J. Dalp'sche Buch- und Kunsthandlung (K. Schmid), 1881, 147p., In German.

Avalanches, Avalanche forecasting, Snowfall, Snow cover stability, Accidents, Meteorological data, Air temperature, Wind (meteorology), Switzerland

51-4095

Nutrients near the arctic pole region.

Shen, Z.L., *Chinese journal of oceanology and limnology,* 1996, 14(4), p.303-307, 13 refs.

Marine biology, Oceanographic surveys, Nutrient cycle, Sampling, Ice composition, Snow composition, Water chemistry, Snow ice interface, Ice water interface, Chemical analysis, Distribution, Arctic Ocean

51-4096

Application of discrete dipole approximation by modelling of radar backscattering from ice crystals at 94 GHZ. [Anwendung der Diskreten Dipol-Approximation zur Modellierung von Radar-Rückstreuung an Eiskristallen bei 94 GHz]

Lemke, H., *GKSS—Forschungszentrum Geesthacht GmbH. Report,* 1996, 96/E/42, 82p., In German with English summary. Refs. p.78-82. Dissertation submitted to the University of Hamburg.

Cloud physics, Remote sensing, Radar echoes, Ice detection, Backscattering, Ice crystal optics, Polarization (waves), Ice crystal structure, Classifications, Water content, Statistical analysis

51-4097

Doppler acoustic velocity profiling in the Arctic.

Beck, S., Pinkel, R., Morison, J., IEEE Working Conference on Current Measurement, 3rd, Jan. 22-24, 1986, Airlie, VA. Proceedings, New York, Institute of Electrical and Electronics Engineers, 1986, p.163-168, 1 ref.

DLC GC239.2.I33a

Oceanography, Ocean currents, Sounding, Velocity measurement, Acoustic measurement, Profiles, Spectra, Subglacial observations, Wave propagation, Accuracy, Arctic Ocean

51-4098

Medium resolution turbulence cluster for upper ocean measurements under sea ice.

McPhee, M.G., IEEE Working Conference on Current Measurement, 3rd, Jan. 22-24, 1986, Airlie, VA. Proceedings, New York, Institute of Electrical and Electronics Engineers, 1986, p.215-220, 4 refs.

DLC GC239.2.I33a

Oceanography, Ocean currents, Velocity measurement, Sea ice distribution, Ice surveys, Subglacial observations, Ice water interface, Turbulent boundary layer, Turbulent exchange, Ice heat flux, Measuring instruments, Lasers

51-4099

Dynamics and binding of a Type III antifreeze protein in water and on ice.

Madura, J.D., Taylor, M.S., Wierzbicki, A., Harrington, J.P., Sikes, C.S., Sönnichsen, F., *Journal of molecular structure (Theochem),* Dec. 11, 1996, Vol.388, Annual Conference of Current Trends in Computation Chemistry, 4th, Vicksburg, MS, Nov. 3-4, 1995. Proceedings, p.65-77, 21 refs.

Cryobiology, Antifreezes, Freezing points, Solutions, Ice water interface, Ice prevention, Molecular structure, Hydrogen bonds, Heterogeneous nucleation, Molecular energy levels, Simulation, Ice models

51-4100

Meiobenthos communities of some subarctic lakes.

Skvortsov, V.V., *Hydrobiologia,* Jan. 17, 1997, Vol.342/343, p.117-124, 30 refs.

Limnology, Biomass, Ecosystems, Bottom sediment, Microbiology, Tundra soils, Hydrocarbons, Soil pollution, Environmental impact, Sampling, Hydrogeochemistry, Statistical analysis

51-4101
Variability of meltwater and solute fluxes from homogeneous melting snow at the laboratory scale.
Harrington, R.F., Bales, R.C., Wagnon, P., *Hydrological processes,* July 1996, 10(7), p.945-953, 15 refs.
Snow hydrology, Snow composition, Snow melting, Meltwater, Water flow, Solutions, Seepage, Ion exchange, Ion density (concentration), Ice water interface, Hydrogeochemistry

51-4102
Modeling of antarctic sea ice in a general circulation model.
Wu, X.R., Simmonds, I., Budd, W.F., *Journal of climate,* Apr. 1997, 10(4), p.593-609, 64 refs.
Climatology, Sea ice distribution, Ice cover thickness, Floating ice, Ice heat flux, Ice water interface, Air ice water interaction, Snow cover effect, Thermodynamics, Ice models, Ice forecasting, Seasonal variations, Simulation, Advection
A dynamic-thermodynamic sea ice model is developed and coupled with the Melbourne University general circulation model to simulate the seasonal cycle of the antarctic sea ice distribution. The model is efficient, rapid to compute, and useful for a range of climate studies. The thermodynamic part of the sea ice model is similar to that developed by Parkinson and Washington, the dynamics contain a simplified ice rheology that resists compression. The thermodynamics is based on energy conservation at the top surface of the ice/snow, the ice/water interface, and the open water area to determine the ice formation, accretion, and ablation. Simulated sea ice thickness and concentration are in good agreement with observations over most regions and serve to indicate the importance of advection and ocean drift in the determination of the sea ice distribution. (Auth. mod.)

51-4103
Underwater light field in the Bellingshausen and Amundsen Seas (Antarctica).
Stambler, N., Lovengreen, C., Tilzer, M.M., *Hydrobiologia,* Jan. 31, 1997, Vol.344, p.41-56, 39 refs.
Marine biology, Biomass, Plankton, Sea water, Optical properties, Solar radiation, Attenuation, Radiation absorption, Radiance, Ecosystems, Chlorophylls, Light effects, Antarctica—Amundsen Sea, Antarctica—Bellingshausen Sea
The aim of this study was to characterize the light environment within the open ocean in Bellingshausen and Admunsen Seas, to determine how the measured chlorophyll concentration influences the underwater light field, and then estimate phytoplankton biomass from the light field data. Downwelling irradiance spectra, upwelling radiance spectra, and attenuation coefficients for downwelling irradiance are shown. The variations of radiance reflectances with wavelength and depth were correlated with chlorophyll concentrations. In particular, the contribution of autofluorescence of the chlorophyll to the underwater light climate was analyzed. In addition underwater UV-A data for this area are presented. These parameters, which describe the underwater light field in quantitative terms, are necessary for optical type classification as well as for models to be developed for remote sensing. (Auth. mod.)

51-4104
Applications of laser ranging to ocean, ice, and land topography.
Degnan, J.J., *SPIE—The International Society for Optical Engineering. Proceedings,* 1991, Vol.1492, Earth and atmospheric remote sensing. Edited by R.J. Curran et al, p.176-186, 19 refs.
DLC G70.39.E27
Remote sensing, Geophysical surveys, Spacecraft, Lasers, Topographic surveys, Geodetic surveys, Ice sheets, Glacier surveys, Height finding, Sensor mapping

51-4105
Radar sorts the rain from the snow.
Muir, H., *New scientist,* Apr. 5, 1997, 154(2076), p.18.
Precipitation (meteorology), Weather forecasting, Snowfall, Rain, Hailstones, Drops (liquids), Detection, Radar echoes, Polarization (waves)

51-4106
Southern oceans hold key to climate.
Pearce, F., *New scientist,* Apr. 5, 1997, 154(2076), p.21.
Paleoclimatology, Climatic changes, Paleoecology, Ocean currents, Ice sheets, Ice melting, Water temperature, Water transport, Heat transfer
The waxing and waning of ocean currents almost as far south as Antarctica may have triggered regular growth spurts in antarctic ice sheets over the past 140,000 years. Researchers in Britain and Germany studying fossilized protozoans in the southern Atlantic say that their finding may lead to better predictions of the rate of global warming. (Auth.)

51-4107
Introduction of bacteria of the genus *Rhodococcus* into oil-contaminated tundra soils.
Koronelli, T.V., Komarova, T.I., Il'inskiĭ, V.V., Kuz'min, IU.I., Kirsanov, N.B., Ianeko, A.S., *Applied biochemistry and microbiology,* Mar.-Apr. 1997, 33(2), p.172-175, Translated from Prikladnaia biokhimiia i mikrobiologiia. 7 refs.
Soil microbiology, Soil pollution, Soil tests, Hydrocarbons, Tundra soils, Degradation, Countermeasures, Bacteria, Environmental tests, Environmental impact

51-4108
Icing calculations on a typical commercial jet engine inlet nacelle.
Al-Khalil, K.M., Keith, T.G., Jr., De Witt, K.J., *Journal of aircraft,* Jan.-Feb. 1997, 34(1), p.87-93, 14 refs.
Aircraft icing, Jet engines, Ice accretion, Electric heating, Ice prevention, Air flow, Water transport, Fluid dynamics, Heat transfer, Drops (liquids), Simulation, Topographic effects, Mathematical models

51-4109
Design of subscale airfoils with full-scale leading edges for ice accretion testing.
Saeed, F., Selig, M.S., Bragg, M.B., *Journal of aircraft,* Jan.-Feb. 1997, 34(1), p.94-100, 20 refs.
Aircraft icing, Performance, Design, Ice accretion, Tests, Simulation, Models, Correlation, Drops (liquids), Fluid dynamics, Viscous flow

51-4110
Experimental deterioration of highway concrete by chloride deicing salts.
Cody, R.D., Cody, A.M., Spry, P.G., Gan, G.L., *Environmental & engineering geoscience,* 1996, 2(4), p.575-588, 27 refs.
Concrete pavements, Concrete durability, Salting, Aggregates, Chemical ice prevention, Corrosion, Damage, Mechanical tests, Freeze thaw tests, Chemical composition, Ion exchange

51-4111
Geographical distribution of freeze/thaw and wet/dry cycles in the United States.
Arnold, J.G., Allen, P.M., Ramanarayanan, T.S., Srinivasan, R., Muttiah, R.S., *Environmental & engineering geoscience,* 1996, 2(4), p.596-603, 36 refs.
Hydrogeology, Frost weathering, Distribution, Freeze thaw cycles, Water balance, Moisture transfer, Indexes (ratios), Seasonal variations, Mapping, Statistical analysis, Correlation, United States

51-4112
Solid-state spin trapping of the hydroxyl radical formed by gamma-irradiation in ice and the scavenging effect of sodium L-ascorbate.
Yoshioka, H., Yoshioka, H., Hasegawa, K., *Bioscience, biotechnology, and biochemistry,* Dec. 1996, 60(12), p.1971-1975, 15 refs.
Ice physics, Photochemical reactions, Gamma irradiation, Frozen liquids, Ice spectroscopy, Spectra, Scavenging, Molecular structure

51-4113
Selection of chemical products for oilfield applications in arctic environments.
Powell, D.E., VanderWende, E., *Materials performance,* Apr. 1997, 36(4), p.58-62, 7 refs.
Petroleum industry, Hydrocarbons, Reservoirs, Oil wells, Arctic landscapes, Winter maintenance, Solutions, Chemical properties, Cold weather performance, Antifreezes, Protective coatings, Corrosion, Environmental protection

51-4114
On the melting of ice balls.
Herrero, M.A., Velázquez, J.J.L., *SIAM journal on mathematical analysis,* Jan. 1997, 28(1), p.1-32, 19 refs.
Ice physics, Ice melting, Stefan problem, Ice water interface, Water temperature, Temperature variations, Thermal analysis, Boundary value problems, Mathematical models

51-4115
New airborne Polar Nephelometer for the measurements of optical and microphysical cloud properties. Part I: theoretical design.
Gayet, J.F., Crépel, O., Fournol, J.F., Oshchepkov, S., *Annales geophysicae,* Apr. 1997, 15(4), p.451-459, 18 refs.
Clouds (meteorology), Cloud physics, Meteorological instruments, Sensors, Particles, Cloud droplets, Ice crystal optics, Light scattering, Optical properties, Photometry, Lasers, Design, Theories

51-4116
New airborne Polar Nephelometer for the measurement of optical and microphysical cloud properties. Part II: preliminary tests.
Crépel, O., Gayet, J.F., Fournol, F.F., Oshchepkov, S., *Annales geophysicae,* Apr. 1997, 15(4), p.460-470, 23 refs.
Clouds (meteorology), Meteorological instruments, Photometry, Sensors, Ice detection, Cloud physics, Optical properties, Ice crystal optics, Light scattering, Cold chambers, Performance, Accuracy

51-4117
Perpetual ice as a climatic sensor—results of the Spitsbergen Expedition. [Das "ewige" Eis als Klimasensor—Ergebnisse der Spitzbergen-Expedition]
Blümel, W.D., *Forschung—Mitteilungen der DFG,* 1996, No.1, p.4-7., In German.
Climatology, Glacier ice, Glacier oscillation, Calving, Climatic changes, Global change, Correlation, Norway—Spitsbergen

51-4118
European stratospheric monitoring stations in the Arctic—ESMOS/Arctic.
Larsen, N., Knudsen, B., Eriksen, P., Mikkelsen, I.S., Andersen, S.B., Jørgensen, T.S., *Danish Meteorological Institute. Scientific report,* 1996, 96-11, 14p., 15 refs.
Climatology, Polar atmospheres, Atmospheric composition, Aerosols, Polar stratospheric clouds, Degradation, Ozone, Weather stations, Backscattering, Radio echo soundings, Seasonal variations, Statistical analysis

51-4119
Solar radiation transport in arctic cirrus. [Solarer Strahlungstransport in arktischem Cirrus]
Koch, W., *GKSS—Forschungszentrum Geesthacht GmbH. Report,* 1996, 96/E/60, 99p., In German with English summary. Refs. p.94-99. Dissertation submitted to the Faculty of Geological Sciences of Hamburg University.
Clouds (meteorology), Cloud physics, Cloud cover, Optical properties, Climatology, Solar radiation, Ice crystal optics, Water content, Wave propagation, Radiation balance, Mathematical models, Particle size distribution

51-4120
Annual report 1995. [Årsmelding 1995]
Norsk Polarinstitutt, Oslo, [1996], 21p., In Norwegian. List of publications p.17-21.
Organizations, Research projects, Regional planning, Cost analysis, Norway—Svalbard

51-4121
South Pole Tunneling System. Operation and maintenance manuals. Volume 1: general equipment description, set-up, operation, and maintenance.
Walsh, M.R., ed, MP 4034, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, Mar. 1997, 41p., Prepared for the U.S. National Science Foundation, Division of Polar Programs, and Antarctic Support Associates.
Snow tunnels, Tunneling (excavation), Undersnow facilities, Ice cutting, Machinery, Construction equipment, Snow removal equipment, Manuals, Antarctica—Amundsen-Scott Station
This is Vol.1 of 4 volumes of manuals for the South Pole Tunneling System (SPoTs), a system to excavate unlined tunnels beneath the snow for use as utility corridors or personnel passageways. The tunneling system was first deployed in Jan. 1996 at the Amundsen-Scott Station. Work was suspended for the season and then resumed in Nov. 1996 when a 400'-long, 6'-wide by 10'-high unlined tunnel 43' below the snow surface, for the station's wastewater facility, was

completed. The tunneler is a modified Bobcat Model 231 tracked mini-excavator with the dipper stick and bucket removed and replaced with a hydraulically-powered horizontal cutter drum 6' wide by 2' in diameter. The cutter drum is positioned horizontally across the width of the tunnel at right angles to the side walls during excavation, but can be rotated to a vertical position to mill the side walls. The excavated snow is transported through a series of telescoping and flexible ducts to a snow blower on the surface.

51-4122

South Pole Tunneling System. Operation and maintenance manuals. Volume 2: electrical and electronic systems manual.

Arnold, T.W., Morse, J.S., Williams, C.R., MP 4035, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, Mar. 1997, Var. p.

Snow tunnels, Tunneling (excavation), Ice cutting, Machinery, Construction equipment, Electric equipment, Electric power, Engines, Engine starters, Specifications, Manuals

This is Vol.2 of 4 volumes of manuals for the South Pole Tunneling System. This volume includes specifications, block diagrams, schematics, and manufacturers' manuals for the electrical and electronic systems. The equipment covered includes the motor systems; soft starter; electronic controls, installation and operation of the caterpillar generator set (genset); control cab and boom inclinometer; temperature controller; heaters; and laser leveler. Also included are 32 color photographs of the equipment.

51-4123

South Pole Tunneling System. Operation and maintenance manuals. Volume 3: hydraulic and mechanical systems manual.

Walsh, M.R., MP 4036, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, Mar. 1997, 268p.

Snow tunnels, Tunneling (excavation), Ice cutting, Snow removal equipment, Engines, Electric equipment, Machinery, Construction equipment, Specifications, Manuals

This is Vol.3 of 4 volumes of manuals for the South Pole Tunneling System. This volume includes specifications, block diagrams, schematics, and manufacturers' manuals for the hydraulic and mechanical power control and transmission systems of the tunneler and snow blower. Equipment covered in detail includes motors, pumps, valves, hydraulic oil, and gearboxes. Also included are a number of color photographs passim of the equipment.

51-4124

South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual.

Walsh, M.R., Arnold, T.W., Lambert, D.J., Morse, J.S., Williams, C.R., MP 4037, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, Mar. 1997, 51p.

Snow tunnels, Tunneling (excavation), Ice cutting, Snow removal equipment, Machinery, Construction equipment, Manuals

This is Vol.4 of 4 volumes of manuals for the South Pole Tunneling System. This volume is the operator's manual for the entire tunneling system. Operations covered include controls, starting, machining adjustments, laser alignment, maintenance, and shutdown of the tunneler; operation and configuration of the ducts, transition sled, and snow blower for the snow chip removal system; operation and safety procedures for the drill rig for drilling vertical access holes to the tunnel (the drill rig is particularly dangerous and can be life threatening if not handled properly); and the startup, operation, monitoring, and shutdown of the generator set.

51-4125

Origin and evolution of Triton.

McKinnon, W.B., Lunine, J.I., Banfield, D., Neptune and Triton. Edited by D.P. Cruikshank, Tucson, University of Arizona Press, 1995, p.807-877, Refs. p.869-877.

DLC QB691.N46

Extraterrestrial ice, Satellites (natural), Geologic processes, Regolith, Ground ice, Tectonics, Gravity, Radiant heating, Geomorphology

51-4126

Geology of Triton.

Croft, S.K., Kargel, J.S., Kirk, R.L., Moore, J.M., Schenk, P.M., Strom, R.G., Neptune and Triton. Edited by D.P. Cruikshank, Tucson, University of Arizona Press, 1995, p.879-947, Refs. p.942-947.

DLC QB691.N46

Extraterrestrial ice, Satellites (natural), Geologic processes, Regolith, Surface properties, Ground ice, Geomorphology, Landforms, Spaceborne photography, Volcanoes, Pit and mound topography

51-4127

Triton's plumes: discovery, characteristics, and models.

Kirk, R.L., Soderblom, L.A., Brown, R.H., Kieffer, S.W., Kargel, J.S., Neptune and Triton. Edited by D.P. Cruikshank, Tucson, University of Arizona Press, 1995, p.949-989, Refs. p.987-989.

DLC QB691.N46

Satellites (natural), Extraterrestrial ice, Atmospheric composition, Geocryology, Volcanoes, Ground ice, Explosion effects, Magma, Ice melting, Vapor pressure, Turbulent boundary layer

51-4128

Surface composition and photometric properties of Triton.

Brown, R.H., Cruikshank, D.P., Veverka, J., Helfenstein, P., Eluszkiewicz, J., Neptune and Triton. Edited by D.P. Cruikshank, Tucson, University of Arizona Press, 1995, p.991-1030, Refs. p.1026-1030.

DLC QB691.N46

Satellites (natural), Extraterrestrial ice, Ground ice, Regolith, Phase transformations, Microstructure, Photometry, Seasonal variations, Albedo, Ice temperature, Remote sensing

51-4129

Lower atmospheric structure and surface-atmosphere interactions on Triton.

Yelle, R.V., Lunine, J.I., Pollack, J.B., Brown, R.H., Neptune and Triton. Edited by D.P. Cruikshank, Tucson, University of Arizona Press, 1995, p.1031-1105, Refs. p.1102-1105.

DLC QB691.N46

Satellites (natural), Extraterrestrial ice, Atmospheric composition, Frost, Ground ice, Ice sublimation, Aerosols, Photochemical reactions, Cloud physics, Condensation

51-4130

Snow survey bulletin—June 1, 1996.

British Columbia. BC Environment. Water Management Division, Victoria, British Columbia, 1996, 50p.

Snow surveys, Snow hydrology, Runoff, River basins, Snow accumulation, Snow depth, Snow water equivalent, Seasonal variations, Statistical analysis, Canada—British Columbia

51-4131

Absorption and scattering properties of the Martian dust in the solar wavelengths.

Ockert-Bell, M.E., Bell, J.F., III, Pollack, J.B., McKay, C.P., Forget, F., *Journal of geophysical research*, Apr. 25, 1997, 102(E4), p.9039-9050, 38 refs.

Mars (planet), Cloud physics, Extraterrestrial ice, Atmospheric composition, Optical properties, Aerosols, Dust, Ice crystals, Light scattering, Refractivity, Brightness, Models

51-4132

Modeling the Martian seasonal water cycle.

Houben, H., Haberle, R.M., Young, R.E., Zent, A.P., *Journal of geophysical research*, Apr. 25, 1997, 102(E4), p.9069-9083, 37 refs.

Mars (planet), Climatology, Extraterrestrial ice, Hydrologic cycle, Seasonal variations, Regolith, Adsorption, Ground ice, Ice sublimation, Moisture transfer, Models

51-4133

Measurement of H_2O adsorption under Mars-like conditions: effects of adsorbent heterogeneity.

Zent, A.P., Quinn, R.C., *Journal of geophysical research*, Apr. 25, 1997, 102(E4), p.9085-9095, 23 refs.

Mars (planet), Extraterrestrial ice, Regolith, Ground ice, Ice formation, Hydrologic cycle, Vapor diffusion, Soil air interface, Clay minerals, Adsorption, Isotherms, Simulation, Models

51-4134

Eruption of lava flows on Europa: theory and application to Thrace Macula.

Wilson, L., Head, J.W., Pappalardo, R.T., *Journal of geophysical research*, Apr. 25, 1997, 102(E4), p.9263-9272, 40 refs.

Satellites (natural), Extraterrestrial ice, Ice mechanics, Ground ice, Geocryology, Cracking (fracturing), Regolith, Tectonics, Volcanoes, Magma, Fluid flow, Theories, Geomorphology

51-4135

Jupiter's odd bunch.

Spencer, J., *New scientist*, Apr. 5, 1997, 154(2076), p.42-45.

Extraterrestrial ice, Satellites (natural), Regolith, Topographic features, Ground ice, Geocryology, Spaceborne photography, Geologic processes

51-4136

Cold weather concreting.

ACI Committee 306, ACI manual of concrete practice. Part 2—construction practices and inspection; pavements, Detroit, American Concrete Institute, 1995, p.306R-1-306R-23, ACI 306R-88, 31 refs.

Winter concreting, Specifications, Standards

51-4137

Standard specification for cold weather concreting (306.1-90).

ACI Committee 306, ACI manual of concrete practice. Part 2—construction practices and inspection; pavements, Detroit, American Concrete Institute, 1995, p.306.1-1-306.1-5, ACI 306.1.90.

Winter concreting, Specifications, Standards

51-4138

STRATÉOLE experiment project.

Vial, F., et al, European Space Agency, ESA SP-370 and ESA Symposium on European Rocket and Balloon Programmes and Related Research, 12th, Lillehammer, Norway, May 29-June 1, 1995. Proceedings, Noordwijk, The Netherlands, 1995, p.355-360, For another version of this article see I-56378. 19 refs.

DLC QC879.59.A1E83 1995

Research projects, Ozone, Stratosphere, Meteorological instruments, Atmospheric composition, Atmospheric circulation, Wind factors, Solar radiation, Models, Aerosols

The STRATÉOLE experiment is designed to study the wintertime antarctic lower stratosphere polar vortex and its springtime breakdown. To this end, it is planned to fly a large number (around 200) of long-lived (3 months), small isopycnic drifting balloons instrumented with temperature and pressure sensors, GPS and transmitters. The main goal of STRATÉOLE experiment is to provide an unprecedented documentation of the wind field in the vicinity of the vortex edge in order to study vortex porosity and erosion, filamentation and mixing properties of the air masses. In addition, by the use of other sensors on some gondolas, like radiometers and tuneable laser diodes, STRATÉOLE will also provide *in-situ* and/or column-integrated trace species measurements (like NO_2, O_3, CH_4, H_2O, aerosols...) and information on the radiation budget of the antarctic lower stratosphere during this period. This will permit to obtain a better understanding of mechanisms responsible for ozone depletion occurring during the springtime vortex dilution. (Auth.)

51-4139

Constructional and environmental aspects of structural materials at Antarctica and Indian Himalayas.

Pathak, R.C., Materials Engineering Conference, 4th, Washington, D.C., Nov.10-14, 1996. Proceedings. Vol.2. Materials for the new millenium, edited by K.P. Chong, New York, ASCE, 1996, p.968-977, 12 refs.

DLC TA401.3.M3762 1996

Cold weather construction, Construction materials, Geocryology, Water supply, Seasonal freeze thaw, Fires, Protection, Antarctica—Maitri Station

The author had participated in the 9th Indian Antarctic Expedition in 1989-90 and was involved in the construction of the experimental greenhouse at the Maitri Station as a civil engineer. He describes the experiences gained in Antarctica, as well as those gained in the western Himalayas, through studies of geocryology and geotechnical and structural aspects of various types of modular shelters, vehicle sheds, etc. He concludes that the conventional construction materials and techniques do not meet all the desired requisites in such extremely cold environments and that there is a need to devise special construction materials for those conditions. (Auth. mod.)

51-4140
Witness the Arctic, Spring 1997, Vol.5, No.1.
Arctic Research Consortium of the United States (ARCUS), Fairbanks, AK, 1997, 20p., For selected papers see 51-3987 and 51-4141.
Organizations, Research projects, International cooperation, Regional planning

51-4141
Arctic Research at the Cold Regions Research and Engineering Laboratory (CRREL).
U.S. Army Cold Regions Research and Engineering Laboratory, MP 4038, *Witness the Arctic,* Spring 1997, 5(1), 4p., Loose insert.
Organizations, Research projects, Education

51-4142
Climate variability in the Americas from high elevation ice cores.
Hardy, D.R., ed, Bradley, R.S., ed, Arlington, VA, U.S. National Science Foundation, Inter-American Institute for Global Change Research (IAI), Apr. 1997, 26p., 44 refs. Report of an IAI workshop, San Carlos de Bariloche, Argentina, Dec. 11-13, 1996.
Mountain glaciers, Alpine glaciation, Glacial meteorology, Ice cores, Paleoclimatology, Atmospheric circulation, Climatic changes, Global change, Andes

51-4143
Local disposal of storm water in cold climate.
Stenmark, C., Luleå, Sweden, University of Technology, 1992, Var. p., Licentiate thesis. Refs. passim.
Municipal engineering, Sanitary engineering, Snowmelt, Runoff, Sewage disposal, Seepage, Drains, Drainage, Water pipes, Frost protection

51-4144
Patterns and mechanisms of year-to-year variability in winter oxygen depletion rates in ice-covered lakes.
Asplund, T.R., Madison, University of Wisconsin, 1993, 86p., M.S. thesis. 50 refs.
Frozen lakes, Lake ice, Ice cover effect, Algae, Photosynthesis, Nutrient cycle, Lake water, Water chemistry, Limnology, Statistical analysis

51-4145
Preparation and operation of vehicular equipment in extreme winter areas. [Préparation et utilisation des véhicules en conditions hivernales extrême]
Canada. Department of National Defence, Ottawa, 1982, Var. p., In parallel English and French. Pages incorrectly collated in source.
Motor vehicles, Military equipment, Engines, Winter maintenance, Fuels, Lubricants, Coolants, Cold weather operation, Cold weather performance, Specifications, Standards

51-4146
Floristic inventory of vascular and cryptogam plant species at Fort Richardson, Alaska.
Lichvar, R., Racine, C., Murray, B., Tande, G., Lipkin, R., Duffy, M., MP 4039, *U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS. Technical report,* Mar. 1997, EL-97-4, 23p. + appends., Refs. passim.
Vegetation patterns, Plant ecology, Forest tundra, Mosses, Lichens, Trees (plants), Military facilities, Site surveys, United States—Alaska—Fort Richardson
The Army Land-Condition Trend Analysis (LCTA) program, an inventory of vascular and cryptogam plant species, was undertaken to support both the LCTA sampling teams and other natural resource programs at Fort Richardson, AK. This inventory provides the baseline record of the existing flora for LCTA. Specimens were collected for vascular plants and cryptogams. Collection of cryptogam plants was restricted to ground-inhabiting cryptogams (mosses, lichens, and liverworts).

51-4147
Photoperiodic induction of dormancy and freezing tolerance in *Betula pubescens*. Involvement of ABA and dehydrins.
Welling, A., Kaikuranta, P., Rinne, P., *Physiologia plantarum,* May 1997, 100(1), p.119-125, 24 refs.
Plant physiology, Trees (plants), Cold tolerance, Frost resistance, Plant tissues, Solar radiation, Light effects, Simulation, Cold weather survival, Growth

51-4148
Ice surface reactions with acids and bases.
Delzeit, L., Powell, K., Uras, N., Devlin, J.P., *Journal of physical chemistry B,* 1997, 101(13), p.2327-2332, 32 refs.
Ice physics, Ice surface, Cryogenics, Adsorption, Phase transformations, Deuterium oxide ice, Infrared spectroscopy, Ice spectroscopy, Molecular structure, Proton transport, Spectra, Hydrogen bonds, Hydrates

51-4149
Melting and nucleation behaviour of clathrates in multivolatile fluid inclusions: evidence of thermodynamic disequilibrium.
Murphy, P.J., Roberts, S., *Chemical geology,* Feb. 14, 1997, 135(1-2), p.1-20, 37 refs.
Clathrates, Phase transformations, Ice physics, Hydrates, Gas inclusions, Carbon dioxide, Ice vapor interface, Ice melting, Thermodynamic properties, Ice spectroscopy, Stability, Temperature measurement

51-4150
Effect of possible Taylor columns on the summer ice retreat in the Chukchi Sea.
Martin, S., Drucker, R., *Journal of geophysical research,* May 15, 1997, 102(C5), p.10,473-10,482, 23 refs.
Oceanography, Sea ice distribution, Seasonal variations, Ice melting, Bottom topography, Synthetic aperture radar, Spaceborne photography, Topographic effects, Ocean currents, Water transport, Fluid dynamics, Viscosity, Ice water interface, Chukchi Sea

51-4151
Characterization of the Antarctic Polar Frontal Zone to the north of South Georgia in summer 1994.
Trathan, P.N., Brandon, M.A., Murphy, E.J., *Journal of geophysical research,* May 15, 1997, 102(C5), p.10,483-10,497, 42 refs.
Oceanographic surveys, Hydrography, Ocean currents, Bottom topography, Topographic effects, Seasonal variations, Water transport, Velocity measurement, Icebergs, Drift, —South Georgia
The Polar Front (PF) forms the southern boundary to the Polar Frontal Zone (PFZ) along the northern edge of the Antarctic Circumpolar Current (ACC). In a number of areas the position of the PF (and thus the PFZ) is known to be influenced by topographic steering, while local bathymetry has also been implicated in the movement and retention of various associated mesoscale features. This paper examines the structure and position of the PF as it passes over the rugged bathymetry to the north of the Scotia Sea. Results are presented from an oceanographic transect crossing the PF to the northwest of South Georgia and from a pair of shorter transects south of the PF but north and east of the first. Associated with the PF was a narrow, high-speed flow embedded in broader, slower moving regions. The area where these two flows meet was found to be variable over the 30-day timescale of the cruise. This area is known to be of major biological significance, and variability in the local oceanography is possibly of crucial importance to many predator species breeding at the northern end of South Georgia. (Auth. mod.)

51-4152
Interior structure of degassed water as studied by the four-photon polarization spectroscopy method.
Bunkin, A.F., Bunkin, N.F., Lobeĭev, A.V., Nurmatov, A.A., *Physics letters A,* Feb. 3, 1997, 225(4-6), p.349-355, 26 refs.
Ice physics, Water structure, Molecular structure, Ice spectroscopy, Lasers, Polarization (waves), Spectra, Ice microstructure, Bubbles, Electric charge, Low frequencies, Vapor diffusion, Solubility, Ice vapor interface

51-4153
Large-scale circulation and water mass distribution in the Arctic Ocean from model results and observations.
Gerdes, R., Schauer, U., *Journal of geophysical research,* Apr. 15, 1997, 102(C4), p.8467-8483, 48 refs.
Oceanographic surveys, Ocean currents, Hydrography, Water transport, Ventilation, Bottom topography, Topographic effects, Heat transfer, Salinity, Mathematical models, Arctic Ocean

51-4154
Decadal variability of hydrography in the upper northern North Atlantic in 1948-1990.
Reverdin, G., Cayan, D., Kushnir, Y., *Journal of geophysical research,* Apr. 15, 1997, 102(C4), p.8505-8531, 64 refs.
Oceanography, Ocean currents, Subpolar regions, Sea ice distribution, Ice cover effect, Advection, Salinity, Hydrography, Water transport, Statistical analysis, Seasonal variations, Atlantic Ocean

51-4155
Estimating the full-scale flexural and compressive strength of first-year sea ice.
Kovacs, A., MP 4040, *Journal of geophysical research,* Apr. 15, 1997, 102(C4), p.8681-8689, 28 refs.
Sea ice, Ice floes, Ice mechanics, Ice cover strength, Ice cover thickness, Compressive properties, Flexural strength, Ice solid interface, Strains, Brines, Porosity, Electrical resistivity, Electrical measurement, Sounding
Sea ice salinity, density, and temperature data were used to develop new methods for determining the bulk brine volume and porosity of sea ice floes. Methods for estimating full-thickness ice sheet strength, based on large-scale field tests, are presented. The relationships among bulk sea ice properties, strain rate, and strength are illustrated. A new constitutive equation was developed for predicting the full-thickness horizontal compressive strength of first-year sea ice as a function of the applied strain rate and bulk porosity. An example of the first-year sea ice indentation force against a 90-m wide structure is given. Estimating sea ice strength based on remote ice conductivity measurements is also discussed conceptually.

51-4156
On an efficient numerical method for modeling sea ice dynamics.
Zhang, J.L., Hibler, W.D., III, *Journal of geophysical research,* Apr. 15, 1997, 102(C4), p.8691-8702, 18 refs.
Sea ice, Ice mechanics, Rheology, Viscoelasticity, Ice plasticity, Plastic flow, Drift, Mathematical models, Ice models, Computerized simulation

51-4157
Cloud simulations with the Max Planck Institute for Meteorology general circulation model ECHAM4 and comparison with observations.
Chen, C.T., Roeckner, E., *Journal of geophysical research,* Apr. 27, 1997, 102(D8), p.9335-9350, 43 refs.
Clouds (meteorology), Climatology, Cloud cover, Classifications, Cloud physics, Ice crystals, Ice detection, Water content, Global change, Simulation

51-4158
Calibrating the ice core paleothermometer using seasonality.
Van Ommen, T.D., Morgan, V., *Journal of geophysical research,* Apr. 27, 1997, 102(D8), p.9351-9357, 32 refs.
Paleoclimatology, Ice sheets, Ice cores, Boreholes, Isotope analysis, Air temperature, Seasonal variations, Statistical analysis, Correlation, Geochronology
High-resolution oxygen isotope measurements on the Dome Summit South (DSS) ice core from Law Dome provide a seasonal profile that is sufficiently stable and undistorted by biases in accumulation to permit comparison with measured temperature seasonality. This comparison yields an isotope-temperature relation with a gradient (dδdT) of 0.44±0.02 per mill/°C and provides a new method for exploring the isotope-temperature relationship at high-accumulation sites. If applied to the observed isotope record from the DSS core, which extends through the last glacial and beyond, this calibration suggests that at its coldest the last glaciation was ca. 13°C colder than present at this site (after correcting for elevation change). This finding compares with a temperature difference of ca. 8°C computed by using the local spatially derived calibration. (Auth. mod.)

51-4159
SCAR report No.13, Nov. 1996.
Scientific Committee on Antarctic Research, Cambridge, UK, Scott Polar Research Institute, 1996, 37p.
Research projects, Climatic changes, Global change, Ice sheets, Sea level, Ice cores, Paleoclimatology
This bulletin consists of 3 reports and 6 appendices: Report of the 1995 bipolar meeting of the GLOCHANT/IGBP-PAGES Task Group 2 on paleoenvironments from ice cores; Report of the 1995 meeting of the GLOCHANT Task Group 3 on ice sheet mass balance and sea-level (ISMASS); and Report of the 4th meeting of the Group of Specialists (GLOCHANT IV). The overall themes of the meetings were as follows: the update of major antarctic and Greenland

drilling projects; the coordination of ice radar sounding surveys of the grounding zone of the Antarctic Ice Sheet and that of surface mass balance and ice velocities measurements; and the overview of the SCAR Global Change Programme and status reporting on each of the linkages with other SCAR groups and international organizations.

51-4160

Spectral UV measurements over Europe within the Second European Stratospheric Arctic and Midlatitude Experiment activities.

Bais, A.F., et al, *Journal of geophysical research,* Apr. 20, 1997, 102(D7), p.8731-8736, 13 refs.

Climatology, Stratosphere, Polar atmospheres, Cloud cover, Optical properties, Ozone, Solar radiation, Ultraviolet radiation, Spectra, Radiometry, Statistical analysis

51-4161

Infrared spectroscopy of sulfuric acid/water aerosols: freezing characteristics.

Clapp, M.L., Niedziela, R.F., Richwine, L.J., Dransfield, T., Miller, R.E., Worsnop, D.R., *Journal of geophysical research,* Apr. 20, 1997, 102(D7), p.8899-8907, 33 refs.

Climatology, Cloud physics, Aerosols, Solutions, Ice vapor interface, Freezing points, Ice formation, Supercooling, Polar stratospheric clouds, Simulation, Temperature effects, Infrared spectroscopy, Chemical composition, Spectra

51-4162

Three-dimensional simulation of the antarctic ozone hole: impact of anthropogenic chlorine on the lower stratosphere and upper troposphere.

Brasseur, G.P., Tie, X.X., Rasch, P.J., Lefèvre, F., *Journal of geophysical research,* Apr. 20, 1997, 102(D7), p.8909-8930, 48 refs.

Climatology, Cloud physics, Air pollution, Polar stratospheric clouds, Degradation, Ozone, Aerosols, Heterogeneous nucleation, Models, Seasonal variations

This paper presents a global three-dimensional transport-chemical model of the stratosphere which includes a representation of the formation of polar stratospheric clouds (PSCs) and heterogeneous reactions on the surfaces of PSCs and sulfate aerosols. The formation of the observed springtime "antarctic ozone hole" is well reproduced by the model. A maximum of 40% total ozone depletion occurs in Oct. Model calculations show that the calculated ozone depletion is not significantly modified when type I PSC particles are assumed to be liquid ternary solutions rather than solid nitric acid trihydrates. Ice particles (type II PSCs) sediment into the troposphere, producing a large decrease in the concentrations of stratospheric HNO_3 and NO_2. As a result, the conversion of ClO into $ClONO_2$ is reduced. The model results show that the ozone minimum observed in Antarctica several decades ago (preindustrial chlorine levels) is produced by (natural) dynamical processes. Under these conditions the polar ozone depletion caused by chemical processes was very small (maximum of 3%) in Oct. In Nov. the ozone concentration even increased above 22 km in response to PSC processes. (Auth. mod.)

51-4163

Ten years of ozonesonde measurements at the south pole: implications for recovery of springtime antarctic ozone.

Hofmann, D.J., Oltmans, S.J., Harris, J.M., Johnson, B.J., Lathrop, J.A., *Journal of geophysical research,* Apr. 20, 1997, 102(D7), p.8931-8943, 32 refs.

Climatology, Polar atmospheres, Stratosphere, Aerosols, Ozone, Profiles, Radio echo soundings, Air temperature, Degradation, Volcanic ash, Seasonal variations, Statistical analysis, Antarctica—Amundsen-Scott Station

In 1986, following identification of the springtime antarctic ozone hole phenomenon, the National Oceanic and Atmospheric Administration Climate Monitoring and Diagnostics Laboratory began a program of weekly ozone balloon soundings at the Amundsen-Scott Station at the south pole. Supplemented by additional flights during the springtime ozone-depletion period, this continuing program has provided annual estimates of the severity of the antarctic ozone-depletion phenomenon. This paper summarizes the 10-year history of these flights at the south pole and provides information on when the healing of the ozone hole will be observed. (Auth. mod.)

51-4164

Coupled aerosol-chemical modeling of UARS HNO_3 and N_2O_5 measurements in the arctic upper stratosphere.

Bekki, S., et al, *Journal of geophysical research,* Apr. 20, 1997, 102(D7), p.8977-8984, 41 refs.

Climatology, Polar atmospheres, Cloud physics, Polar stratospheric clouds, Degradation, Aerosols, Advection, Atmospheric composition, Chemical properties, Ozone, Heterogeneous nucleation, Simulation

51-4165

Does availability of potassium affect cold hardening of Scots pine through polyamine metabolism?

Sarjala, T., Taulavuori, K., Savonen, E.M., Edfast, A.B., *Physiologia plantarum,* Jan. 1997, 99(1), p.56-62, 22 refs.

Plant physiology, Trees (plants), Cold tolerance, Frost resistance, Acclimatization, Nutrient cycle, Plant tissues, Sampling, Temperature effects, Simulation

51-4166

Acoustic diffraction from a semi-infinite elastic plate under arbitrary fluid loading with application to scattering from arctic ice leads.

Dahl, P.H., *Woods Hole Oceanographic Institution. Report,* 1989, WHOI-89-28, 156p., ADA-225 568, Ph.D. thesis awarded jointly with Massachusetts Institute of Technology. 73 refs.

Ice openings, Ice edge, Ice water interface, Ice cover effect, Ice acoustics, Underwater acoustics, Sound transmission, Sound waves, Elastic waves, Wave propagation, Mathematical models

51-4167

Numerical, analytical and observational study of the effect of clouds on surface wind stress during the central arctic winter.

Guest, P.S., Monterey, CA, U.S. Naval Postgraduate School, 1992, 177p., ADA-252 706, Ph.D. thesis. Refs. p.165-175.

Polar atmospheres, Marine atmospheres, Cloud cover, Cloud dissipation, Wind pressure, Wind velocity, Atmospheric boundary layer, Turbulent exchange, Air ice water interaction, Ice air interface, Ice heat flux, Drift, Mathematical models

51-4168

Applications of spectral microwave radiometry to sensing of sea ice and the ocean surface.

St. Germain, K.M., Amherst, University of Massachusetts, 1993, 92p., ADA-289 138, Ph.D. thesis. 22 refs.

Ice surveys, Sea ice distribution, Ice conditions, Ice cover thickness, Ice edge, Ice temperature, Ice heat flux, Ice air interface, Air ice water interaction, Ice dielectrics, Radiometry, Spaceborne photography, Mathematical models

51-4169

Ice crystal growth model for cirrus cloud formation.

Ou, S.C., Liou, K.N., Frankel, D., Cloud Impacts on DoD Operations and Systems Conference (CIDOS-95), Hanscom AFB, MA, Oct 24-26, 1995. Preprint, Hanscom AFB, MA, U.S. Air Force Phillips Laboratory, 1995, p.157-159, ADA-300 914, 5 refs.

Cloud physics, Cloud cover, Ice crystal growth, Ice nuclei

51-4170

Validation of the Appleman contrail forecasting scheme using engine-specific aircraft data.

Speltz, D.J., Cloud Impacts on DoD Operations and Systems Conference (CIDOS-95), Hanscom AFB, MA, Oct 24-26, 1995. Preprint, Hanscom AFB, MA, U.S. Air Force Phillips Laboratory, 1995, p.169-171, ADA-300 914, 8 refs.

Aircraft, Condensation trails, Ice forecasting, Ice detection

51-4171

Predicting the radiative properties of non-spherical particles: application to cirrus clouds.

Mitchell, D.L., Macke, A., Cloud Impacts on DoD Operations and Systems Conference (CIDOS-95), Hanscom AFB, MA, Oct 24-26, 1995. Preprint, Hanscom AFB, MA, U.S. Air Force Phillips Laboratory, 1995, p.173-175, ADA-300 914, 5 refs.

Cloud cover, Cloud physics, Ice crystal optics, Ice crystal size, Radiation absorption, Scattering

51-4172

Statistics on the optical properties of cirrus clouds measured with the High Spectral Resolution Lidar.

Eloranta, E.W., Piironen, P., Cloud Impacts on DoD Operations and Systems Conference (CIDOS-95), Hanscom AFB, MA, Oct 24-26, 1995. Preprint, Hanscom AFB, MA, U.S. Air Force Phillips Laboratory, 1995, p.177-179, ADA-300 914, 4 refs.

Cloud physics, Cloud cover, Ice crystal optics, Atmospheric attenuation, Lidar

51-4173

Operational method of ice-containing clouds based on laboratory and observational data leading to a numerical model for prediction of radiative properties.

Koracin, D., Hallett, J., Cloud Impacts on DoD Operations and Systems Conference (CIDOS-95), Hanscom AFB, MA, Oct 24-26, 1995. Preprint, Hanscom AFB, MA, U.S. Air Force Phillips Laboratory, 1995, p.181-183, ADA-300 914, 4 refs.

Cloud physics, Cloud cover, Ice crystal size, Ice crystal optics, Radiation absorption, Scattering, Atmospheric attenuation, Computerized simulation

51-4174

Anisotropy of diffuse scattering according to the ice rule. [Ice rule ni yoru sanman sanran no ihosei]

Tokunaga, M., Hydrogen physics, Tsukuba, Sep. 29-30, 1992. KEK proceedings 92-20, Tsukuba, Japan, Koenerugi butsurigaku kenkyujo (National Laboratory for High Energy Physics, KEK), Feb. 1993, p.85-90, DE94-701317, In Japanese. 9 refs.

Ice crystal structure, Molecular structure, Molecular energy levels, Hydrogen bonds, Proton transport, Ion diffusion

51-4175

Frost evolution in tailings. Final report.

EBA Engineering Consultants Ltd., Edmonton, Alberta, Ottawa, Atomic Energy Control Board, Apr. 1991, 52p. + appends., DE93-612749, With French summary. 90 refs.

Mining, Tailings, Radioactive wastes, Waste disposal, Permafrost forecasting, Permafrost heat balance, Permafrost preservation, Frost penetration, Ground thawing, Thaw depth, Thermal analysis, Computerized simulation

51-4176

Binary ice nucleation on SiO_2 particles.

Bogdan, A., Gorbunov, B.Z., Kruppa, A., Kulmala, M., Finnish National Aerosol Symposium, 5th, Espoo, Finland, June 1-3, 1993. Report series in aerosol science, Espoo, Finnish Association for Aerosol Research, 1993, p.25-30, DE95-737628, 8 refs.

Cloud physics, Stratosphere, Atmospheric composition, Aerosols, Ice nuclei, Heterogeneous nucleation

51-4177

Polar stratospheric cloud formation: nucleation and freezing mechanisms of nitric acid and sulphuric acid aerosols.

Laaksonen, A., MacKenzie, A.R., Kulmala, M., Finnish National Aerosol Symposium, 5th, Espoo, Finland, June 1-3, 1993. Report series in aerosol science, Espoo, Finnish Association for Aerosol Research, 1993, p.138-143, DE95-737628, 15 refs.

Polar atmospheres, Atmospheric composition, Polar stratospheric clouds, Cloud physics, Ozone, Aerosols, Ice nuclei, Heterogeneous nucleation

51-4178

Spatial cross-correlation of antarctic sea ice and seabed topography.

De Veaux, R.D., Phelan, M.J., Princeton, NJ, Princeton University, 1990, 24p. + figs., N90-26451, 10 refs. Appendix B only, to U.S. National Aeronautics and Space Administration, Contractor report, NASA-CR-186815, not further identified.

Ice surveys, Sea ice distribution, Ice conditions, Polynyas, Ocean bottom, Bottom topography, Topographic effects, Radio echo soundings, Radiometry, Spaceborne photography, Image processing, Statistical analysis

Sea ice concentrations as observed about Antarctica by the Nimbus-7 Scanning Multichannel Microwave Radiometer (SMMR) satellite in 1983, show that throughout the sea ice, large-scale variations in sea ice concentration correlate systematically with variations in the topography of the seabed. A statistical image-processing filter was designed to extract local patterns of spatial cross-correlation over the entire sea ice field as it undergoes daily changes. Generally, high concentrations of sea ice occur over deep ocean, whereas areas of encavement, early dissipation and polynya formation develop over topographic features of high elevation. The results of spatial cross-correlation indicate a potential role for seabed topography in fluctuations in the sea ice about Antarctica. (Auth. mod.)

51-4179

Studies of the AWI Research Department Potsdam in Antarctica, 1994-1995. [Arbeiten der AWI-Forschungsstelle Potsdam in Antarktika, 1994-1995]

Wand, U., ed, *Berichte zur Polarforschung,* 1996, No.215, 142p., One report in English, four in German. 70 refs.

Expeditions, Sediments, Research projects, Geodetic surveys, Humidity, Gravity, Antarctica—Schirmacher Hills

This report comprises two extended and three short reports. The first report (G. Schwarz) is the account of the first German to participate in a Japanese Antarctic Research Expedition. It centers on deuterium in polar air moisture. The second report (U. Wand, et al) focuses on geological sediments in the Schirmacher Hills region. The third report (W. Karth) provides an update of a geodetic net also in the Schirmacher Hills area. Report four (D. Fritzsche) deals with gravity measurements in the Coastal area of the Schirmacher Hills and along the routes of three earlier traverses. The last report (W.-D. Hermichen) gives an account of the investigations of Shackleton Range during the Euroshack Expedition, Nov. 1994-Mar. 1995.

51-4180

Mesozooplankton in the Laptev Sea and the adjacent eastern Nansen Basin - distribution and community structure in late summer. [Das Mesozooplankton im Laptevmeer und östlichen Nansen-Becken - Verteilung und Gemeinschaftsstrukturen im Spätsommer]

Hanssen, H., *Berichte zur Polarforschung,* 1997, No.229, 131p., In German with English summary. Refs. p.118-127.

Plankton, Biomass, Distribution, Nansen Basin, Russia—Laptev Sea

51-4181

Tropical climate instability: the last glacial cycle from a Qinghai-Tibetan ice core.

Thompson, L.G., et al, *Science,* June 20, 1997, 276(5320), p.1821-1825, 63 refs.

Climatic changes, Ice cores, Geochronology, Paleoclimatology, China—Qinghai Province

51-4182

Abrupt Early to Mid-Holocene climatic transition registered at the equator and the poles.

Stager, J.C., Mayewski, P.A., *Science,* June 20, 1997, 276(5320), p.1834-1836, 45 refs.

Climatic changes, Ice cores, Atmospheric circulation, Global change, Antarctica—Taylor Dome

Paleoclimatic records from equatorial East Africa, Antarctica, and Greenland reveal that atmospheric circulation changed abruptly at the early to mid-Holocene transition to full postglacial conditions. A climatic reorganization occurred at all three sites between 8200 and 7800 years ago that lasted 200 years or less and appears to have been related to abrupt transitions in both marine and terrestrial records around the world. (Auth.)

51-4183

Annual SCAR report on national antarctic scientific activities, 1 July 1995-30 June 1996.

Belgian National Committee on Antarctic Research, Brussels, Belgium, Royal Academy of Belgium, Dec. 1996, 8p.

Research projects, Low temperature research

Outlines of projects carried out by working groups from July 1995 to June 1996, and those planned for 1997-2000, are presented. The outlines, covering multiple disciplines, include the locality and duration of the investigations, as well as the names and addresses of principal investigators. A list of contact addresses concludes the report.

51-4184

Annual SCAR report on national antarctic scientific activities, 1 July 1995-30 June 1997.

Australian National Committee on Antarctic Research, Kingston, Tasmania, Australian Antarctic Division, 1996, 33p.

Research projects, Glaciology, Low temperature research

The report begins by listing Australian antarctic stations, providing their names, location and coordinates. Automatic recording stations/observatories, with identifying names and coordinates, and automatic weather stations and drifting buoys, with site name, coordinates, and satellite number, are also listed. This is followed by outlines of projects carried out in 1995-1996, and those planned for 1996-1997, covering numerous disciplines. The outlines include the subject, location and duration of the investigations, as well as the names and addresses of principal investigators. A list of contact addresses concludes the report.

51-4185

Formation of Quaternary sediments on Kassari Island.

Plink, P., Kask, J., Eltermann, G., *Estonia. Geological Survey. Bulletin,* 1992, 2(1), p.32-37, 1 ref.

Glacial geology, Geomorphology, Pleistocene, Glacial deposits, Marine deposits, Quaternary deposits, Bedrock, Lithology, Stratigraphy, Eolian soils, Estonia—Kassari Island

51-4186

Winter update: deicers and their use. *Public works,* Apr. 1997, 128(4), p.32-33.

Road maintenance, Winter maintenance, Road icing, Ice removal, Ice control, Chemical ice prevention, Solutions, Performance, Salting, Cost analysis

51-4187

Kansas City, Missouri's snow and ice control program.

Frevert, L., *Public works,* Apr. 1997, 128(4), p.62-64.

Road maintenance, Winter maintenance, Urban planning, Road icing, Salting, Snow removal equipment, Logistics, Ice control, Weather forecasting, United States—Missouri—Kansas City

51-4188

"Tire chains on demand" please snow control crews.

Reed, W.E., *Public works,* Apr. 1997, 128(4), p.70.

Road maintenance, Winter maintenance, Snow removal, Snow removal equipment, Tires, Traction, Machinery, Portable equipment, Performance

51-4189

Anti-icing, part one—relieving the pressure.

Barger, S., *Public works,* Jan. 1997, 128(1), p.37-38, 2 refs.

Winter maintenance, Road maintenance, Road icing, Chemical ice prevention, Ice solid interface, Ice control, Environmental impact, Education

51-4190

Organic solutes in freezing tolerance.

Storey, K.B., *Comparative biochemistry and physiology,* July 1997, 117A(3), p.319-326, 37 refs.

Cryobiology, Solutions, Frost resistance, Cold weather survival, Supercooling, Polymers, Desiccation

51-4191

Infrared absorption study of the hydrogen-bond symmetrization in ice to 110 GPa.

Aoki, K., Yamawaki, H., Sakashita, M., Fujihisa, H., *Physical review B,* Dec. 1, 1996, 54(22), p.15,673-15,677, 26 refs.

Ice physics, Molecular structure, Hydrogen bonds, Ice spectroscopy, High pressure tests, Infrared spectroscopy, Spectra, Hydrogen bonds, Vibration, Phase transformations, Proton transport

51-4192

Characteristic vertical wavenumbers for the polar mesosphere.

Hall, C.M., Hoppe, U.P., *Geophysical research letters,* Apr. 15, 1997, 24(8), p.837-840, 8 refs.

Atmospheric physics, Polar atmospheres, Atmospheric circulation, Gravity waves, Spectra, Radar echoes, Sounding, Velocity measurement, Oscillations, Turbulent exchange

51-4193

Laboratory and in situ evidence for the presence of ice particles in a PMSE region.

Zadorozhnyĭ, A.M., et al, *Geophysical research letters,* Apr. 15, 1997, 24(8), p.841-844, 19 refs.

Atmospheric physics, Atmospheric electricity, Electric fields, Radar echoes, Ice crystals, Ice detection, Particles, Sensors, Charge transfer, Accuracy, Ice electrical properties, Impact tests

51-4194

Accuracy of temperatures from UKMO analyses of 1994/95 in the arctic winter stratosphere.

Pullen, S., Jones, R.L., *Geophysical research letters,* Apr. 15, 1997, 24(8), p.845-848, 6 refs.

Climatology, Air temperature, Polar atmospheres, Stratosphere, Polar stratospheric clouds, Temperature measurement, Temperature variations, Forecasting, Freezing points, Sounding, Correlation, Accuracy, Statistical analysis

51-4195

Variations of tropospheric HCl amounts over northern Sweden.

Wegner, A., Stiller, G.P., von Clarmann, T., Trieschmann, O., Fischer, H., Reimer, E., *Geophysical research letters,* Apr. 15, 1997, 24(8), p.849-852, 14 refs.

Climatology, Atmospheric boundary layer, Atmospheric composition, Air pollution, Infrared spectroscopy, Aerosols, Ozone, Stratosphere, Atmospheric circulation, Statistical analysis, Correlation, Sweden

51-4196

Wintertime in situ profile of BrO between 17 and 27 km in the arctic vortex.

McKinney, K.A., Pierson, J.M., Toohey, D.W., *Geophysical research letters,* Apr. 15, 1997, 24(8), p.853-856, 14 refs.

Climatology, Polar atmospheres, Stratosphere, Atmospheric composition, Profiles, Aerosols, Turbulent diffusion, Aerial surveys, Sampling, Photochemical reactions, Diurnal variations

51-4197

1991-1992 Atmospheric Methane anomaly: southern hemisphere ^{13}C decrease and growth rate fluctuations.

Lowe, D.C., Manning, M.R., Brailsford, G.W., Bromley, A.M., *Geophysical research letters,* Apr. 15, 1997, 24(8), p.857-860, 31 refs.

Climatology, Polar atmospheres, Aerosols, Air pollution, Natural gas, Turbulent diffusion, Sampling, Isotope analysis, Carbon isotopes, Seasonal variations, Environmental tests

Measurements of atmospheric methane from 1989-1996 at Baring Head, New Zealand, and at Scott Base, Antarctica show a seasonal cycle in the mixing ratio with a peak to peak amplitude of 28 ppb. $\delta^{13}C$ values also show a seasonal cycle approximately 6 months out of phase with the mixing ratio cycle. A pronounced negative anomaly in $\delta^{13}C$ occurred in 1992 with annual average values dropping from -47.08 per mill to -47.28 per mill. Although a combination of causes cannot be ruled out, decreased emissions from an isotopically heavy source such as biomass burning best meet the constraints of the data. (Auth. mod.)

51-4198

Radiocarbon content of pre-bomb marine mollusks and variations in the ^{14}C reservoir age for coastal areas of the Barents and Kara seas, Russia.

Forman, S.L., Poliak, L.V., *Geophysical research letters,* Apr. 15, 1997, 24(8), p.885-888, 24 refs.

Geochronology, Oceanography, Water chemistry, Reservoirs, Marine biology, Biomass, Radioactive isotopes, Carbon isotopes, Radioactive age determination, Geochemistry, Periodic variations, Russia—Kara Sea, Barents Sea

51-4199

Satellite-derived maps of arctic and antarctic sea ice motion: 1988 to 1994.

Emery, W.J., Fowler, C.W., Maslanik, J.A., *Geophysical research letters*, Apr. 15, 1997, 24(8), p.897-900, 24 refs.

Oceanography, Ice surveys, Sea ice distribution, Drift, Spaceborne photography, Radiometry, Brightness, Sensor mapping, Seasonal variations

Standard image processing methods applied to Special Sensor Microwave/Imager data provide previously unseen details about sea ice motion in the arctic and southern oceans. Means calculated from daily ice motions for 1988-1994 confirm the basic circulation patterns established from drifting stations and buoys, but extend these observations to illustrate less well-known transport patterns in the arctic coastal zones and sub-arctic seas. In the Antarctic, the gridded motion fields show a nearly continuous westward transport along the antarctic coast, with well-defined regions of exchange between this East Wind Drift and the Antarctic Circumpolar Current. This detailed view of mean ice motion in the southern ocean is unique and presents a comprehensive overview not previously available for antarctic ice motions. (Auth. mod.)

51-4200

Case history of the Nipterk P-32 spray ice island.

Weaver, J.S., Poplin, J.P., *Canadian geotechnical journal*, Feb. 1997, 34(1), p.1-16, With French summary. 19 refs.

Oceanography, Ice islands, Offshore drilling, Offshore structures, Construction, Spray freezing, Ice (construction material), Ice loads, Ice mechanics, Ice solid interface, Design criteria, Ice strength, Performance, Beaufort Sea

51-4201

Creep and strength tests on warm dry spray ice.

Weaver, J.S., Been, K., Horsfield, D.W., *Canadian geotechnical journal*, Feb. 1997, 34(1), p.17-25, With French summary. 11 refs.

Ice islands, Ice (construction material), Simulation, Spray freezing, Ice creep, Rheology, Shear strength, Ice mechanics, Strain tests, Design criteria, Ice water interface, Temperature effects

51-4202

Heat and mass transfer in unsaturated soils during freezing.

Newman, G.P., Wilson, G.W., *Canadian geotechnical journal*, Feb. 1997, 34(1), p.63-70, With French summary. 36 refs.

Soil freezing, Frozen ground mechanics, Frozen ground thermodynamics, Heat transfer, Mass transfer, Moisture transfer, Permeability, Freezing front, Water content, Mathematical models, Ice water interface

51-4203

Four cases of rock avalanches in the French Alps. [Quatre cas d'avalanches rocheuses dans les Alpes françaises]

Couture, R., Antoine, P., Locat, J., Hadjigeorgiou, J., Evans, S.G., Brugnot, G., *Canadian geotechnical journal*, Feb. 1997, 34(1), p.102-119, In French with English summary. 33 refs.

Landslides, Avalanches, Mass movements (geology), Alpine landscapes, Rock mechanics, Rock streams, Avalanche tracks, Slope processes, France—Alps

51-4204

Ozone variability in the high latitude summer stratosphere.

Natarajan, M., Callis, L.B., *Geophysical research letters*, May 15, 1997, 24(10), p.1191-1194, 6 refs.

Climatology, Polar atmospheres, Atmospheric composition, Stratosphere, Photochemical reactions, Distribution, Wind direction, Wind factors, Seasonal variations, Ozone, Photometry

51-4205

Radar evidence for a new low-frequency crossed field plasma instability in the polar mesopause region: a case study.

Tsunoda, R.T., Olesen, J.K., Stauning, P., *Geophysical research letters*, May 15, 1997, 24(10), p.1215-1218, 10 refs.

Atmospheric physics, Atmospheric electricity, Polar atmospheres, Electric fields, Low frequencies, Probes, Radar echoes, Backscattering, Spectra, Velocity measurement

51-4206

Phase evolution of young sea ice.

Wettlaufer, J.S., Worster, M.G., Huppert, H.E., *Geophysical research letters*, May 15, 1997, 24(10), p.1251-1254, 23 refs.

Ice physics, Sea ice, Ice growth, Ice openings, Phase transformations, Brines, Porosity, Ice water interface, Buoyancy, Mass transfer, Convection, Subsurface drainage, Simulation, Young ice

51-4207

Recent observations of a spring-summer surface warming over the Arctic Ocean.

Martin, S., Munoz, E., Drucker, R., *Geophysical research letters*, May 15, 1997, 24(10), p.1259-1262, 12 refs.

Climatology, Polar atmospheres, Marine atmospheres, Air temperature, Surface temperature, Seasonal variations, Temperature variations, Oceanographic surveys, Drift stations, Statistical analysis, Air ice water interaction, Arctic Ocean

51-4208

Seasonal evolution of water vapor in the Martian atmosphere-soil-polar caps system.

Aleshin, V.I., *Solar system research*, July-Aug. 1996, 30(4), p.295-299, Translated from Astronomicheskiĭ vestnik. 9 refs.

Mars (planet), Hydrologic cycle, Climatology, Atmospheric composition, Water vapor, Extraterrestrial ice, Moisture transfer, Ice fog, Snowflakes, Snow cover distribution, Snow evaporation, Thermodynamics, Seasonal variations, Mathematical models

51-4209

Nonequilibrium kinetics of rarefied gas in the porous layer of a cometary nucleus.

Skorov, IU.V., *Solar system research*, Jan.-Feb. 1997, 31(1), p.24-37, Translated from Astronomicheskiĭ vestnik. 22 refs.

Extraterrestrial ice, Porous materials, Geochemistry, Dust, Mass flow, Ice sublimation, Vapor diffusion, Ice vapor interface, Mathematical models, Statistical analysis

51-4210

Microbial response to freeze-thaw cycles in tundra and taiga soils.

Schimel, J.P., Clein, J.S., *Soil biology & biochemistry*, Aug. 1996, 28(9), p.1061-1066, 18 refs.

Soil microbiology, Soil tests, Organic soils, Decomposition, Tundra soils, Taiga, Freeze thaw cycles, Biomass, Humidity, Nutrient cycle, Temperature effects

51-4211

Prediction of new formation of frozen soils and stability assessment of pile foundations in gas fields of western Siberia.

Khrustalev, L.N., Pustovoĭt, G.P., Kozlov, A.N., *Soil mechanics and foundation engineering*, Nov. 1996, 33(3), p.115-118, Translated from Osnovaniia, fundamenty i mekhanika gruntov. 3 refs.

Petroleum industry, Natural gas, Pile structures, Stability, Geocryology, Permafrost bases, Permafrost beneath structures, Soil freezing, Frost heave, Frost penetration, Snow cover effect, Snow cover distribution, Design criteria, Frost protection

51-4212

Cretaceous and Tertiary inversion in the Bjørnøyrenna Fault Complex, south-western Barents Sea.

Gabrielsen, R.H., Grunnaleite, I., Rasmussen, E., *Marine and petroleum geology*, Mar. 1997, 14(2), p.165-178, Refs. p.176-178.

Marine geology, Pleistocene, Subpolar regions, Earth crust, Tectonics, Geologic processes, Subsidence, Deformation, Seismic reflection, Barents Sea

51-4213

Russian-German cooperation: the Expedition TAYMYR 1995 and the Expedition KOLYMA 1995 of the ISSP Pushchino Group.

Bol'shiianov, D.IU., ed, Hubberten, H.W., ed, *Berichte zur Polarforschung*, 1996, No.211, 208p., For individual reports see 51-4214 through 51-4221. Refs. p.133-137.

Expeditions, Research projects, Geocryology, Geomorphology, Geochemistry, Permafrost surveys, Organic soils, Sediments, Hydrology, Ecosystems, Russia—Taymyr Peninsula, Russia—Severnaya Zemlya, Russia—Levinson-Lessing, Lake, Russia—Labaz, Lake

51-4214

Relief and Quaternary deposits of the Verkhnyaya Taymyra-Logata area.

Bol'shiianov, D.IU., Federov, G., Antonov, O., *Berichte zur Polarforschung*, 1996, No.211, p.12-27, Russian-German cooperation: The Expedition TAYMYR 1995 and The Expedition Kolyma 1995 of the ISSP Pushchino Group. Edited by D.IU. Bol'shiianov and H.W. Hubberten.

Geologic structures, Quaternary deposits, Geomorphology, Russia—Verkhnyaya Taymyra River, Russia—Logata River, Russia—Levinson-Lessing, Lake

51-4215

Geocryological and paleogeographical studies in the Labaz Lake area.

Siegert, C., Dereviagin, A.IU., Vannahme, G., *Berichte zur Polarforschung*, 1996, No.211, p.28-45, Russian-German cooperation: The Expedition TAYMYR 1995 and The Expedition Kolyma 1995 of the ISSP Pushchino Group. Edited by D.IU. Bol'shiianov and H.W. Hubberten.

Geocryology, Permafrost structure, Permafrost surveys, Boreholes, Soil mapping, Russia—Taymyr Peninsula, Russia—Labaz, Lake

51-4216

Characterization of the organic matter in permafrost soils and sediments of the Taymyr Peninsula/ Siberia and Severnaya Zemlya/Arctic region.

Pfeiffer, E.M., Gundelwein, A., Nöthen, T., Becker, H., Guggenberger, G., *Berichte zur Polarforschung*, 1996, No.211, p.46-63, Russian-German cooperation: The Expedition TAYMYR 1995 and The Expedition Kolyma 1995 of the ISSP Pushchino Group. Edited by D.IU. Bol'shiianov and H.W. Hubberten.

Permafrost structure, Organic soils, Sediments, Soil mapping, Vegetation patterns, Russia—Taymyr Peninsula, Russia—Severnaya Zemlya, Russia—Labaz, Lake, Russia—Levinson-Lessing, Lake

51-4217

Microbiological and botanical studies.

Bölter, M., et al, *Berichte zur Polarforschung*, 1996, No.211, p.64-84, Russian-German cooperation: The Expedition TAYMYR 1995 and The Expedition Kolyma 1995 of the ISSP Pushchino Group. Edited by D.IU. Bol'shiianov and H.W. Hubberten.

Microbiology, Soil surveys, Plants (botany), Carbon dioxide, Microclimatology, Lichens, Russia—Taymyr Peninsula, Russia—Severnaya Zemlya, Russia—Levinson-Lessing, Lake, Russia—Labaz, Lake

51-4218

Hydrological studies.

Hagedorn, B., et al, *Berichte zur Polarforschung*, 1996, No.211, p.85-110, Russian-German cooperation: The Expedition TAYMYR 1995 and The Expedition Kolyma 1995 of the ISSP Pushchino Group. Edited by D.IU. Bol'shiianov and H.W. Hubberten.

Hydrology, Sedimentation, Active layer, River ice, Water temperature, Air temperature, Russia—Taymyra River, Russia—Krasnaya River, Russia—Levinson-Lessing, Lake, Russia—Logata River

51-4219

Lacustrine geological studies.

Overduin, P.P., Bol'shiianov, D.IU., Ebel, T., Hubberten, H.W., *Berichte zur Polarforschung,* 1996, No.211, p.111-124, Russian-German cooperation: The Expedition TAYMYR 1995 and The Expedition Kolyma 1995 of the ISSP Pushchino Group. Edited by D.IU. Bol'shiianov and H.W. Hubberten.

Sediments, Climate, Lacustrine deposits, Russia—Taymyr Peninsula, Russia—Taymyr, Lake, Russia—Levinson-Lessing, Lake, Russia—Labaz, Lake, Russia—Kakora, Lake, Russia—Syrataturku, Lake, Russia—Portnyagino, Lake, Russia—Kungasalakh, Lake, Russia—Geographers, Lake, Russia—Changeable, Lake, Russia—Fjord, Lake

51-4220

Environmental studies.

Bol'shiianov, D.IU., et al, *Berichte zur Polarforschung,* 1996, No.211, p.125-132, Russian-German cooperation: The Expedition TAYMYR 1995 and The Expedition Kolyma 1995 of the ISSP Pushchino Group. Edited by D.IU. Bol'shiianov and H.W. Hubberten.

Snow surveys, Environments, Soil surveys, Ecosystems, Tundra, Thaw depth, Russia—Taymyr Peninsula, Russia—Portnyagino, Lake, Russia—Levinson-Lessing, Lake, Russia—Labaz, Lake

51-4221

Expedition Kolyma 1995 of the ISSP-Pushchino Group.

Samarkin, V., Ostroumov, V., Gubin, S., *Berichte zur Polarforschung,* 1996, No.211, p.199-208, Russian-German cooperation: The Expedition TAYMYR 1995 and The Expedition Kolyma 1995 of the ISSP Pushchino Group. Edited by D.IU. Bol'shiianov and H.W. Hubberten.

Water chemistry, Bacteria, Microbiology, Tundra, Sediments, Permafrost beneath lakes, Methane, Russia—Kolyma Lowland, Russia—Bol'shoi Oler, Lake

51-4222

Pliocene paleoenvironment and antarctic ice sheet behavior: evidence from Wright Valley.

Hall, B.L., Denton, G.H., Lux, D.R., Schlüchter, C., *Journal of geology,* May 1997, 105(3), p.285-294, 39 refs.

Ice sheets, Sediments, Glacier ice, Ice breakup, Glacial deposits, Marine deposits, Paleoclimatology

Investigations in Wright Valley, adjacent to the Transantarctic Mountains in East Antarctica, shed light on the question of whether high-latitude Pliocene climate was warm enough to cause widespread deglaciation of the East Antarctic craton with a concurrent Magellanic moorland-like environment. If Pliocene-age diatoms, presently in glaciogenic deposits high in the Transantarctic Mountains, had come from seaways on the East Antarctic craton, an expanding Late Pliocene ice sheet must have first eroded them from marine sediments and then deposited the diatoms at their present high-altitude locations. This hypothetical expanding glacier would have had to have come through Wright Valley. Glacial drift sediments from the central Wright Valley were mapped, sampled, analyzed, and $^{40}Ar/^{39}Ar$ whole-rock dated. The evidence indicates that an East Antarctic outlet glacier has not expanded through Wright Valley, and hence cannot have overridden the Dry Valleys sector of the Transantarctic Mountains, any time in the past 3.8 myr. Rather, there was only moderate Pliocene expansion of local cold-based alpine glaciers and continuous cold-desert conditions in Wright Valley. Persistence of a cold-desert paleoenvironment implies that the sector of the East Antarctic Ice Sheet adjacent to Wright Valley has remained relatively stable without melting ablation zones since at least 3.8 Ma, in Early Pliocene time. (Auth. mod.)

51-4223

Arecibo radar mapping of the lunar poles: a search for ice deposits.

Stacy, N.J.S., Campbell, D.B., Ford, P.G., *Science,* June 6, 1997, 276(5318), p.1527-1530, 17 refs.

Extraterrestrial ice, Moon, Radar echoes, Sensor mapping

51-4224

Distributed water and energy balance model for vegetated watersheds with seasonal snowpacks.
Harris, D.M., Logan, Utah State University, 1996, 362p., University Microfilms order No.AAD96-36989, Ph.D thesis. For abstract see Dissertation abstracts international, Sec. B, 1996, p.4269.
Hydrologic cycle, Mountains, Watersheds, Forest canopy, Vegetation patterns, Snow hydrology, Water balance, Radiation balance, Snowmelt, Surface drainage, Radiation absorption, Snow cover effect, Seasonal variations, Simulation

51-4225

Glacial geology of southwestern Minnesota with emphasis on the deposits and dynamics of the Des Moines lobe (Laurentide ice sheet).
Patterson, C.J., Duluth, University of Minnesota, 1996, 163p., University Microfilms order No.AAD97-02810, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B., 1997, p.4939.
Pleistocene, Glacial geology, Glacial hydrology, Ice sheets, Glacial deposits, Quaternary deposits, Geomorphology, Subglacial drainage, Glacier oscillation, Mapping, United States—Minnesota

51-4226

Automated tracking of ice floes using nonhomologous regression and local geometric information.
McDevitt, R.J., Charlottesville, University of Virginia, 1996, 158p., University Microfilms order No.AAD97-01309, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, 1997, p.4935.
Sea ice distribution, Ice floes, Drift, Remote sensing, Imaging, Image processing, Correlation, Ice detection, Classifications, Statistical analysis, Accuracy

51-4227

Nitrogen oxide photochemistry in high northern latitudes during spring (nitrogen oxides, ozone).
Beine, H.J., Fairbanks, University of Alaska Fairbanks, 1996, 238p., University Microfilms order No.AAD97-01143, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B., 1997, p.4953.
Climatology, Polar atmospheres, Air pollution, Atmospheric composition, Atmospheric boundary layer, Photochemical reactions, Aerosols, Atmospheric circulation, Ozone, Turbulent diffusion, Seasonal variations, Luminescence, Sampling

51-4228

Modeling snowpack accumulation patterns in Idaho with a geographic information system.
Li, Z.X., Moscow, University of Idaho, 1996, 118p., University Microfilms order No.AAD97-00062, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B., 1997, p.4948.
Water supply, Geophysical surveys, Watersheds, Snow hydrology, Snow water equivalent, Snow accumulation, Seasonal variations, Snow courses, Statistical analysis, Models, United States—Idaho

51-4229

Interfacial fracture of ice (crack initiation).
Whelan, A.E., Iowa City, University of Iowa, 1996, 133p., University Microfilms order No.AAD96-40035, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, 1996, p.5269.
Ice mechanics, Ice solid interface, Crack propagation, Substrates, Thin sections, Surface roughness, Mechanical tests

51-4230

Brittle failure of columnar S2 ice under triaxial compression.
Gratz, E.T., 217p., University Microfilms order No.AAD97-01119, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B., 1997, p.5260.
Sea ice, Ice strength, Ice mechanics, Cracking (fracturing), Sliding, Dynamic loads, Strains, Brittleness, Ice solid interface, Stress concentration, Orientation, Mechanical tests

51-4231

Effects of waves on pancake ice (ice floes).
Frankenstein, S., Potsdam, Clarkson University, 1996, 244p., University Microfilms order No.AAD97-00878, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, 1997, p.5201.

Sea ice, Ice water interface, Ice solid interface, Ice formation, Ice floes, Impact, Water waves, Oscillations, Mathematical models, Ice conditions

51-4232

Several aspects of polycrystalline ice behavior based on micromechanical modeling (shear moduli).

Elvin, A.A., Cambridge, Massachusetts Institute of Technology, 1996, n.p., Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, 1996, p.5143.

Ice physics, Ice mechanics, Ice microstructure, Crack propagation, Elastic properties, Flexural strength, Sliding, Shear modulus, Ice solid interface, Ice deformation, Simulation

51-4233

Infrared absorption spectrum of carbon dioxide ice (Mars).

Hansen, G.B., Seattle, University of Washington, 1996, 343p., University Microfilms order No.AAD96-37950, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, 1996, p.4263.

Mars (planet), Extraterrestrial ice, Carbon dioxide, Ice sheets, Frost, Polar regions, Ice optics, Refractivity, Radiation absorption, Remote sensing, Infrared spectroscopy, Simulation, Spectra

51-4234

Stable isotope tracer study of flow generation mechanisms in a small, semiarid mountain watershed.

Unnikrishna, P.V., Logan, Utah State University, 1996, 230p., University Microfilms order No.AAD96-37003, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, 1996, p.4581.

Watersheds, Surface drainage, Water balance, Snow hydrology, Snowdrifts, Snowmelt, Ground water, Stream flow, Water transport, Hydrogeochemistry, Isotope analysis

51-4235

High-pressure X-ray diffraction study and equation of state of $MgSiO^3$ ilmenite.

Reynard, B., Fiquet, G., Itié, J.P., Rubie, D.C., *American mineralogist,* Jan.-Feb. 1996, 81(1-2), p.45-50, 27 refs.

Lithology, Minerals, Rock properties, Ice physics, High pressure ice, X ray diffraction, High pressure tests, Spectra, Earth crust, Thermodynamic properties, Phase transformations

51-4236

Comprehensive model for correcting point precipitation.

Allerup, P., Madsen, H., Vejen, F., *Nordic hydrology,* 1997, 28(1), p.1-20, 13 refs.

Precipitation (meteorology), Precipitation gages, Measurement, Accuracy, Snowfall, Snow accumulation, Snow air interface, Wind velocity, Wind factors, Statistical analysis, Mathematical models

51-4237

Fabric characteristics of subaerial slope deposits.

Bertran, P., Hétu, B., Texier, J.P., Van Steijn, H., *Sedimentology,* Feb. 1997, 44(1), p.1-16, Refs. p.14-16.

Slope processes, Talus, Periglacial processes, Mass transfer, Sedimentation, Lithology, Physical properties, Classifications, Stratification, Solifluction, Frost action, Statistical analysis

51-4238

Phase transformation of water under shock compression.

Rybakov, A.P., *Journal of applied mechanics and technical physics,* Mar. 1997, 37(5), p.629-633, Translated from Prikladnaia mekhanika i tekhnicheskaia fizika. 21 refs.

Ice physics, Phase transformations, Ice formation, Shock waves, Water temperature, Freezing points, Compressive properties, Liquid phases, Analysis (mathematics)

51-4239

Wave resistance of amphibian air cushion vehicles in broken ice.

Kozin, V.M., Milovanova, A.V., *Journal of applied mechanics and technical physics,* Mar. 1997, 37(5), p.634-637, Translated from Prikladnaia mekhanika i tekhnicheskaia fizika. 10 refs.

Air cushion vehicles, Amphibious vehicles, Ice breaking, Performance, Ice floes, Ice water interface, Atmospheric pressure, Ice cover effect, Oscillations, Wave propagation, Ice navigation, Analysis (mathematics)

51-4240

Thermodynamic model of the Martian atmosphere-soil-polar caps system.

Aleshin, V.I., *Solar system research,* Mar.-Apr. 1996, 30(2), p.150-154, Translated from Astronomicheskiĭ vestnik. 13 refs.

Mars (planet), Climatology, Hydrologic cycle, Atmospheric pressure, Stability, Carbon dioxide, Ice sheets, Extraterrestrial ice, Diurnal variations, Snow evaporation, Thermodynamics, Mathematical models

51-4241

Design of ventilation systems for underground placer mines in the Arctic: analysis of mine—the thermal regime.

Bandopadhyay, S., Wu, H.G., Nelson, M.G., Izaxon, V., US Mine Ventilation Symposium, 7th, Lexington, KY, June 5-7, 1995. Proceedings, Littleton, Society for Mining, Metallurgy, and Exploration, Inc., 1995, p.27-32, 4 refs.

DLC TN301.M56

Placer mining, Ventilation, Design, Frozen ground strength, Soil temperature, Air temperature, Heat transfer, Thermal regime, Temperature control, Ice air interface, Ice water interface, Phase transformations, Analysis (mathematics), Permafrost preservation

51-4242

Cold Climate HVAC '97. Proceedings.

International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, 252p., Refs. passim. For selected papers see 51-4243 through 51-4272.

Buildings, Houses, Heating, Heat recovery, Ventilation, Indoor climates, Climate control, Utilities, Cold weather construction, Cold weather performance

51-4243

Low-energy steel house for a cold climate.

Nieminen, J., Saari, M., Salmi, P., Tattari, K., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.1-6, 3 refs.

Houses, Steel structures, Thermal insulation, Heating, Cold weather construction, Cold weather performance, Finland

51-4244

Air leakage effects on additional wall insulation with exterior plaster.

Levin, P., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.7-12, 1 ref.

Buildings, Houses, Walls, Thermal insulation, Air leakage, Sweden

51-4245

Indoor swimming pools in cold climates.

Kjerulf-Jensen, P., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.13-18, 2 refs.

Buildings, Indoor climates, Climate control, Humidity, Dehumidification, Ventilation, Cold weather performance, Cold weather construction

51-4246

Desiccation of concrete floor structures—methods to shorten drying time.

Gränne, F., Levin, P., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.19-24, 4 refs.

Buildings, Floors, Concrete slabs, Concrete heating, Concrete curing, Drying, Thermal insulation, Sweden

51-4247

Perceived air quality and ventilation requirements at higher latitudes.

Fanger, P.O., Fang, L., Tanabe, S., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.25-35, 41 refs.

Buildings, Indoor climates, Climate control, Ventilation, Human factors engineering

51-4248

Present tendencies of air quality control in ventilation and air cleaning systems in cold climate.

Bitkolov, N., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.37-42.

Buildings, Indoor climates, Climate control, Ventilation, Human factors engineering, Health

51-4249

Are IAQ new proposals energy sustainable in cold climates.

Giaccone, A., Grippaldi, V., Pietrafesa, M., Rizzo, G., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.69-75, 8 refs.

Buildings, Indoor climates, Climate control, Ventilation, Cold weather construction, Cold weather performance, Building codes, Standards

51-4250

Non-traditional and renewable sources of energy in absorption-compression heat pumps.

Morosuk, T., Morosuk, L., Shamraĭ, A., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.77-81, 2 refs.

Heat pumps, Heat sources, Heat transfer

51-4251

Systems for low temperature heating.

Jóhannesson, G., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.91-99, 2 refs.

Buildings, Houses, Heating, Heat transfer, Ventilation, Cold weather construction, Cold weather performance

51-4252

Climate cooling using domestic cold water.

Bergqvist, B., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.101-105, 5 refs.

Buildings, Cooling systems, Air conditioning, Indoor climates, Climate control, Water temperature

51-4253

Practical use of an uncertainty method for energy conservation calculations.

Pettersen, T.D., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.107-112, 5 refs.

Buildings, Heating, Cold weather construction, Cost analysis, Statistical analysis, Norway

51-4254

Balancing of heating systems as key issue in energy saving.

Dzelzītis, E., Mepārs, U., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.113-116.

Buildings, Heating, Heat loss, Cold weather performance, Cold weather construction, Cost analysis, Regional planning, Economic development, Latvia

51-4255

Utilisation factor of two Swedish buildings.

Akander, J., Jóhannesson, G., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.117-122, 7 refs.

Houses, Heating, Heat recovery, Thermal insulation, Cold weather performance, Cold weather construction, Sweden

51-4256

Cold climate and low-energy studies in Rovaniemi Polytechnic.

Airaksinen, R., Nieminen, J., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.123-127, 3 refs.

Organizations, Research projects, Education, Buildings, Houses, Cold weather construction, Cold weather performance

51-4257

ThermoNet® a significant advance in energy technology.

Åström, H., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.129-132, 3 refs.

Buildings, Heating, Heat pipes, Heat transmission, Heat recovery, Cooling systems, Air conditioning, Ventilation, Dehumidification, Utilities, Sweden, Finland

51-4258

Geothermal district heating in Iceland.

Jónsson, V.K., Frimannsson, H., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.133-142, 3 refs.

Geothermy, Heating, Heat recovery, Heat transmission, Heat pipes, Utilities, Iceland

51-4259
Statistical methods in district heating in Iceland.
Jónsson, G.R., Pálsson, O.P., Jónsson, V.K., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.143-148, 11 refs.
Heating, Heat transmission, Utilities, Design criteria, Research projects, Regional planning, Statistical analysis, Iceland

51-4260
System approach to district heating.
Burd, A.L., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.149-160, 14 refs.
Buildings, Heating, Heat pipes, Heat transmission, Heat recovery, Utilities, Municipal engineering, Computerized simulation

51-4261
Corrosion in geothermal district heating systems.
Einarsson, Á., Gunnlaugsson, E., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.161-166, 4 refs.
Geothermy, Heating, Heat recovery, Heat transmission, Heat pipes, Water pipelines, Utilities, Water chemistry, Steels, Corrosion, Iceland

51-4262
Implementation of geothermal pilot project in the district heating system of Liepaja City.
Eihmanis, E., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.167-171.
Geothermy, Heating, Heat recovery, Heat transmission, Heat pipes, Utilities, Municipal engineering, Latvia

51-4263
Perlan—compromise between daylight, visibility and thermal comfort.
Björnsson, O.B., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.173-180, 7 refs.
Buildings, Indoor climates, Climate control, Heating, Ventilation, Windows, Human factors engineering, Iceland

51-4264
Reykjavik City Hall: heating and ventilating system.
Jónsson, P., Árnason, Ó., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.193-196.
Buildings, Indoor climates, Climate control, Heating, Ventilation, Iceland

51-4265
Use of 3-D modelling programs with VRML in HVAC planning.
Nielsen, A., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.197-202, 6 refs.
Buildings, Heating, Ventilation, Computer programs, Computerized simulation, Environment simulation

51-4266
Ventilation heating system for cold climates.
Laine, J., Saari, M., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.203-208, 4 refs.
Buildings, Houses, Ventilation, Heating, Heat recovery, Indoor climates, Climate control, Cold weather construction, Cold weather performance, Finland

51-4267
Prospects of the heat pipe heat exchangers in the cold climate countries.
Kosoi, B.V., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.209-213, 3 refs.
Heating, Heat pipes, Heat recovery, Heat transfer, Cold weather performance, Cold weather construction, Mathematical models

51-4268
Energy recovery possibilities in natural ventilation of office buildings.
Skåret, E., Blom, P., Hestad, T., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.215-220, 3 refs.
Buildings, Ventilation, Heating, Heat recovery, Heat transfer, Indoor climates, Climate control

51-4269
Snow melting—safer cities.
Ragnarsson, R., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.221-228, 4 refs.
Geothermy, Heating, Artificial melting, Snow melting, Snow removal, Road maintenance, Municipal engineering, Iceland

51-4270
Simulation of temperature changes under the road heating panel.
Iwamoto, K., Sayama, S., Kyo, S., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.229-234, 3 refs.
Heating, Artificial melting, Snow melting, Snow removal, Ice prevention, Road maintenance, Computerized simulation, Japan—Hokkaido

51-4271
Air-tightness of buildings and the required heating load—are current design criteria appropriate for a windy region.
Marteinsson, B., Sigurjónsson, J., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, p.239-245, 4 refs.
Houses, Heating, Heat loss, Air leakage, Ventilation, Thermal insulation, Indoor climates, Climate control, Wind factors, Design criteria, Iceland

51-4272
ThermoNet® system description.
Åström, H., International Conference on Cold Climate Heating Ventilating and Air-Conditioning, 2nd, Reykjavík, Iceland, Apr. 30-May 3, 1997. Cold Climate HVAC '97, Reykjavík, ICEVAC, the Icelandic Heating, Ventilating and Sanitary Association, 1997, 10p., Handout at the conference not included in the conference proceedings.
Buildings, Electric power, Heat recovery, Heating, Heat transfer, Cooling systems, Air conditioning, Ventilation, Municipal engineering, Utilities, Sweden, Finland

51-4273
Sellafield leaves its mark on the frozen north.
Pearce, F., *New scientist*, May 10, 1997, 154(2081), p.14.
Water pollution, Ocean currents, Radioactivity, Radioactive wastes, Waste disposal, Environmental impact, Sampling, Arctic Ocean

51-4274
Global wobbling may melt the ice.
Hecht, J., *New scientist*, May 10, 1997, 154(2081), p.22.
Pleistocene, Paleoclimatology, Paleoecology, Global warming, Radioactive age determination, Insolation, Glacier oscillation, Glacier melting, Periodic variations

51-4275
Radiation beams de-ice planes.
Kiernan, V., *New scientist*, May 3, 1997, 154(2080), p.23.
Aircraft icing, Ice removal, Ice melting, Infrared radiation, Natural gas, Fires, Radiation absorption, Environmental protection

51-4276
Inelastic neutron scattering study of high density amorphous water ice.
Li, J.C., Jenniskens, P., *Planetary and space science*, Apr. 1997, 45(4), p.469-473, 28 refs.
Extraterrestrial ice, Simulation, Amorphous ice, Molecular structure, Ice density, Phase transformations, Ice spectroscopy, Neutron scattering, Ice crystal optics, Spectra, Vibration, Molecular energy levels

51-4277
Comment on "Transition from *normal* to *fast* sound in liquid water".
Martinez, J.L., et al, *Physical review letters*, Feb. 3, 1997, 78(5), p.975-976, Includes reply. 17 refs. For pertinent paper see 50-5710.
Ice acoustics, Water structure, X ray diffraction, Liquid phases, Solid phases, Acoustic measurement, Sound waves, Neutron scattering, Velocity measurement, Latticed structures

51-4278
Thermal behavior of a nonfreezing water interlayer.
Kuz, V.A., *Journal of colloid and interface science*, June 1, 1997, 190(1), p.114-117, 8 refs.
Water films, Ice water interface, Thermodynamics, Unfrozen water content, Temperature effects, Layers, Porous materials, Mathematical models, Enthalpy, Capillarity, Hygroscopic water

51-4279
Proton-ordered models of ordinary ice for quantum-mechanical studies.
Casassa, S., Ugliengo, P., Pisani, C., *Journal of chemical physics*, May 15, 1997, 106(19), p.8030-8040, 38 refs.
Ice physics, Molecular structure, Ice models, Surface properties, Phase transformations, Molecular energy levels, Proton transport, Computerized simulation, Ice dielectrics, Doped ice, Impurities, Solubility

51-4280
Physical and chemical limnology of 59 lakes located between the southern Yukon and the Tuktoyaktuk Peninsula, Northwest Territories (Canada).
Pienitz, R., Smol, J.P., Lean, D.R.S., *Canadian journal of fisheries and aquatic sciences*, Feb. 1997, 54(2), p.330-346, With French summary. Refs. p.344-346.
Limnology, Classifications, Tundra terrain, Water chemistry, Ecosystems, Hydrogeochemistry, Ion density (concentration), Environmental tests, Sampling, Statistical analysis, Canada—Northwest Territories, Canada—Yukon Territory

51-4281

Physical and chemical limnology of 24 lakes located between Yellowknife and Contwoyto Lake, Northwest Territories (Canada).

Pienitz, R., Smol, J.P., Lean, D.R.S., *Canadian journal of fisheries and aquatic sciences,* Feb. 1997, 54(2), p.347-358, With French summary. Refs. p.356-358.

Limnology, Lake water, Water chemistry, Tundra terrain, Arctic landscapes, Hydrogeochemistry, Organic soils, Ion density (concentration), Sampling, Statistical analysis, Vegetation factors, Environmental tests, Canada—Northwest Territories

51-4282

Input and biogeochemical transformation of dissolved carbon in the Siberian shelf seas.

Olsson, K., Anderson, L.G., *Continental shelf research,* June 1997, 17(7), p.819-833, 33 refs.

Oceanographic surveys, Water chemistry, Geochemical cycles, Carbon dioxide, Biomass, Rivers, Runoff, Sedimentation, Solubility, Sampling, Seasonal variations, Mass transfer, Arctic Ocean

51-4283

Vertical zonation of landscape characteristics in the Namjagbarwa Massif of Tibet, China.

Peng, B.Z., Pu, L.J., Bao, H.S., Higgitt, D.L., *Mountain research and development,* Feb. 1997, 17(1), p.43-48, With French and German summaries. 13 refs.

Mountains, Landscape development, Classifications, Altitude, Vegetation patterns, Snow cover distribution, Snow cover effect, Ice cover effect, Microclimatology, China—Tibet

51-4284

Estimation of snow and glacier-melt contribution of the Chanab River, western Himalaya.

Singh, P., Jain, S.K., Kumar, N., *Mountain research and development,* Feb. 1997, 17(1), p.49-56, With French and German summaries. 16 refs.

River basins, River flow, Hydrography, Mountains, Snowmelt, Glacier melting, Meltwater, Runoff forecasting, Water supply, Water balance, Seasonal variations, Evapotranspiration, India—Himalaya Mountains

51-4285

Proteins in frozen solutions: evidence of ice-induced partial unfolding.

Strambini, G.B., Gabellieri, E., *Biophysical journal,* Feb. 1996, 70(2), p.971-976, 17 refs.

Cryobiology, Frozen liquids, Ice formation, Molecular structure, Deformation, Probes, Luminescence, Ice water interface, Ice spectroscopy, Spectra, Adsorption, Simulation

51-4286

Multispectral remote sensing of aerosols.

Lynch, D.K., *Acta astronautica,* June 1996, 38(12), p.947-953, 24 refs.

Climatology, Atmospheric composition, Aerosols, Cloud physics, Remote sensing, Radiation balance, Infrared spectroscopy, Spectra, Ice crystal size, Ice detection, Particle size distribution, Photometry

51-4287

Non-linear unsteady creep of an ice sheet on a hydraulic foundation.

Aleksandrov, V.M., Shmatkova, A.A., *Journal of applied mathematics and mechanics,* Dec. 1996, 60(4), p.677-681, Translated from Prikladnaia matematika i mekhanika. 8 refs.

Ice sheets, Fast ice, Ice mechanics, Ice creep, Plates, Ice deformation, Ice solid interface, Hydraulic structures, Flexural strength, Mathematical models, Simulation

51-4288

Stimulated orientation of water molecules in the acoustical wave field.

Arakelian, V.S., Bakhshian, H.G., Grigorian, M.G., Karapetian, K.E., *Journal of contemporary physics (Armenian Academy of Sciences),* 1995, 30(2), p.29-33, Translated from Natsional'naia Akademia nauk Armeniĭ. Izvestiia. Fizika. 15 refs.

Water structure, Colloids, Ice structure, Anisotropy, Molecular structure, Orientation, Molecular energy levels, Oscillations, Dielectric properties, Phase transformations, Sound waves, Temperature effects, Analysis (mathematics)

51-4289

Formation of a geometrical ridge network by the surge-type glacier Kongsvegen, Svalbard.

Bennett, J.R., Hambrey, M.J., Huddart, D., Ghienne, J.F., *Journal of Quaternary science,* Nov.-Dec. 1996, 11(6), p.437-449, 44 refs.

Pleistocene, Geomorphology, Landforms, Arctic landscapes, Glacial geology, Quaternary deposits, Glacial deposits, Glacier beds, Lithology, Ice push, Glacier surges, Ice solid interface, Crevasses, Sediment transport, Norway—Spitsbergen

51-4290

Quaternary lacustrine deposits in a high-energy semi-arid mountain environment, Karakoram Mountains, northern Pakistan.

Owen, L.A., *Journal of Quaternary science,* Nov.-Dec. 1996, 11(6), p.461-483, Refs. p.482-483.

Pleistocene, Mountains, Geomorphology, Glacial lakes, Lacustrine deposits, Quaternary deposits, Sediment transport, Surface drainage, Lithology, Particle size distribution, Ice dams, Glacial hydrology, Landslides, Pakistan—Karakoram Mountains

51-4291

Late Quaternary catastrophic flood in the Lahul Himalayas.

Coxon, P., Owen, L.A., Mitchell, W.A., *Journal of Quaternary science,* Nov.-Dec. 1996, 11(6), p.495-510, 46 refs.

Pleistocene, Quaternary deposits, Lithology, Geomorphology, Glacial lakes, Ice dams, Glacial hydrology, Lake bursts, Flooding, Glacial erosion, India—Himalaya Mountains

51-4292

Measurements of frost creep activity on the plateau de Bure (2,600 m) (Devoluy massif, Hautes-Alpes, France). [Mesures de la cryoreptation sur le plateau de Bure (2 600 M) dans le massif du Dévoluy (Hautes-Alpes, France)]

Pech, P., *Géomorphologie,* Nov.-Dec. 1996, No.4, p.37-60, In French with English summary. Refs. p.57-60.

Alpine landscapes, Geomorphology, Geocryology, Slope processes, Frost action, Ice creep, Periglacial processes, Solifluction, Rock mechanics, Mechanical tests, France—Massif du Dévoluy

51-4293

Using ortho-rectified SAR imagery acquired over rugged terrain for thematic applications in glacier hydrology.

Adam, S., Toutin, T., Pietroniro, A., Brugman, M., *Canadian journal of remote sensing,* Mar. 1997, 23(1), p.76-80, With French summary. 13 refs.

Spaceborne photography, Glacier surveys, Glacial hydrology, Ice edge, Snow line, Sensor mapping, Synthetic aperture radar, Image processing, Resolution, Accuracy, Topographic features

51-4294

Impact of large ice sheets on continental palaeohydrology.

Teller, J.T., Global continental palaeohydrology. Edited by K.J. Gregory et al, Chichester, John Wiley & Sons Ltd., 1995, p.109-129, Refs. p.125-129.

DLC QE39.5.P27 G58

Ice sheets, Pleistocene, Hydrologic cycle, Glaciation, Global change, Ice cover effect, Ice melting, Glacial hydrology, Geomorphology, River basins, Runoff

51-4295

Palaeohydrology of polar and subpolar regions over the past 20 000 years.

Maizels, J.K., Global continental palaeohydrology. Edited by K.J. Gregory et al, Chichester, John Wiley & Sons Ltd., 1995, p.259-299, Refs. p.292-299.

DLC QE39.5.P27 G58

Pleistocene, Hydrology, River flow, River basins, Channels (waterways), Water erosion, Paleoclimatology, Paleoecology, Periglacial processes, Permafrost hydrology, Vegetation patterns, Models

51-4296

Prediction of low-temperature cracking of asphalt concrete mixtures with thermal stress restrained specimen test results.

Zubeck, H.K., Vinson, T.S., *Transportation research record,* Nov. 1996, No.1545, p.50-58, 8 refs.

Bituminous concretes, Pavements, Concrete slabs, Concrete admixtures, Thermal stresses, Low temperature tests, Mechanical tests, Crack propagation, Tensile properties, Mathematical models, Forecasting, Design criteria

51-4297

Characterizing properties of asphalt cement at cold temperatures.

Stroup-Gardiner, M., Newcomb, D., DeSombre, R., *Transportation research record,* Nov. 1996, No.1545, p.59-66, 9 refs.

Pavements, Low temperature tests, Bituminous concretes, Concrete aggregates, Temperature effects, Shear properties, Thermal stresses, Brittleness, Cracking (fracturing), Design criteria, Mechanical tests

51-4298

Field validation of thermal stress restrained specimen test: six case histories.

Zubeck, H.K., Zeng, H.Y., Vinson, T.S., Janoo, V.C., MP 4041, *Transportation research record,* Nov. 1996, No.1545, p.67-74, 6 refs.

Pavements, Bituminous concretes, Thermal stresses, Mechanical tests, Cracking (fracturing), Low temperature tests, Temperature measurement, Cold weather performance, Statistical analysis, Temperature effects, Forecasting

Construction histories, cracking observations, and temperature data were collected for five test roads in Alaska, Pennsylvania, and Finland. A full-scale and fully controlled low-temperature cracking test program was conducted at the U.S. Army Cold Regions Research and Engineering Laboratory. Specimens were fabricated in the laboratory with original asphalt cements and aggregates from the test roads. The thermal stress restrained specimen test (TSRST) results obtained for these samples were correlated with the field observations. On the basis of a statistical analysis of the data, the TSRST fracture temperature is associated with the field cracking temperature and crack frequency for the test roads where mixture properties dominated low-temperature cracking. It was concluded that the TSRST can be used to simulate low-temperature cracking of asphalt concrete mixtures.

51-4299

Dry ice-UV light process for metal cleaning.

Deffeyes, J.E., Lilenfeld, H.V., Reilly, J.J., Mykytiuk, P.D., *SAMPE journal,* Jan.-Feb. 1997, 33(1), p.58-63, 5 refs.

Metals, Corrosion, Films, Surface properties, Maintenance, Ultraviolet radiation, Dry ice (trademark), Ice blasting, Snow pellets, Abrasion, Environmental protection, Waste disposal

51-4300

Long way to go—modernising the topographic maps of Greenland.

Lehmann, W., Nielsen, A., *GIM international,* May 1997, 11(5), p.24-27.

Geophysical surveys, Geological maps, Topographic maps, Image processing, Computer applications, Subpolar regions, Accuracy, Resolution, Greenland

51-4301
Verification of the frost resistance of a pavement structure. [Vérification au gel des structure de chaussée]
Corté, J.F., Odéon, H., Boutonnet, M., *Bulletin de liaison des Laboratoires des Ponts et Chaussées,* July-Aug. 1995, No.198, p.13-27, 102, In French with English, German, Spanish and Russian summaries. 15 refs.
Pavements, Pavement bases, Cold weather performance, Frost resistance, Thaw weakening, Frost heave, Design criteria, Standards, Protection, Analysis (mathematics)

51-4302
Estimate of the radiation characteristics of spent fuel from submarine and "Lenin" icebreaker reactors scuttled in the region of the archipelago Novaya Zemlya.
Rubtsov, P.M., Ruzhanskiĭ, P.A., *Atomic energy,* Mar. 1997, 81(3), p.656-662, Translated from Atomnaia energiia. 8 refs.
Radioactive wastes, Oceanography, Ocean bottom, Submarines, Icebreakers, Nuclear power, Waste disposal, Environmental impact, Environmental protection, Safety, Statistical analysis, Russia—Novaya Zemlya

51-4303
Evaluation of east coast snow loads following January 1996 storms.
DeGaetano, A.T., Schmidlin, T.W., Wilks, D.S., *Journal of performance of constructed facilities,* May 1997, 11(2), p.90-94, 8 refs.
Snowstorms, Snow loads, Snow depth, Snow water equivalent, Roofs, Bearing strength, Design criteria, Statistical analysis, Periodic variations, Records (extremes), Long range forecasting, Accuracy, Building codes

51-4304
Simple frost-point humidity generator.
Morris, E.C., *Measurement science and technology,* May 1997, 8(5), p.473-478, 12 refs.
Meteorological instruments, Hygrometers, Freezing points, Condensation, Temperature measurement, Accuracy, Design, Low temperature tests, Vapor diffusion, Vapor pressure, Humidity, Water vapor, Saturation, Standards

51-4305
Ice age initiation by an ocean-atmospheric circulation change in the Labrador Sea.
Johnson, R.G., *Earth and planetary science letters,* Apr. 1997, 148(1-2), p.367-379, 55 refs.
Climatology, Global change, Global warming, Ocean currents, Upwelling, Air ice water interaction, Ice sheets, Glaciation, Ice growth, Atmospheric circulation, Marine atmospheres, Moisture transfer, Models, Labrador Sea

51-4306
Interaction between atmosphere, ice cover, and ocean off Labrador and Newfoundland from 1962 to 1992.
Prinsenberg, S.J., Peterson, I.K., Narayanan, S., Umoh, J.U., *Canadian journal of fisheries and aquatic sciences,* 1997, 54(suppl.1), p.30-39, With French summary. 34 refs.
Oceanography, Shores, Sea ice distribution, Ice cover thickness, Seasonal variations, Air ice water interaction, Surface temperature, Atmospheric circulation, Wind factors, Ice cover effect, Canada—Labrador, Canada—Newfoundland

51-4307
Comparison of hydrography and circulation on the Newfoundland Shelf during 1990-1993 with the long-term mean.
Colbourne, E., deYoung, B., Narayanan, S., Helbig, J., *Canadian journal of fisheries and aquatic sciences,* 1997, 54(suppl.1), p.68-80, With French summary. 47 refs.
Oceanography, Hydrography, Marine meteorology, Ocean currents, Sea ice distribution, Ice cover thickness, Air ice water interaction, Air temperature, Seasonal variations, Statistical analysis, Labrador Sea

51-4308
Primary production in the Arctic Ocean estimated from dissolved oxygen.
Pomeroy, L.R., *Journal of marine systems,* Jan. 1997, 10(1-4), p.1-8, 51 refs.
Oceanographic surveys, Marine biology, Microbiology, Biomass, Water chemistry, Oxygen, Supersaturation, Solubility, Organic nuclei, Ice cover effect, Seasonal variations, Arctic Ocean

51-4309
Importance of polynyas, ice edges, and leads to marine mammals and birds.
Stirling, I., *Journal of marine systems,* Jan. 1997, 10(1-4), p.9-21, Refs. p.19-21.
Marine biology, Biomass, Ecology, Sea ice distribution, Polynyas, Ice edge, Ice openings, Ice cover effect, Environmental impact

51-4310
Glaciation, climate history, changing marine levels and the evolution of the Northeast Water Polynya.
Hjort, C., *Journal of marine systems,* Jan. 1997, 10(1-4), p.23-33, 37 refs.
Oceanography, Marine geology, Polynyas, Glaciation, Paleoclimatology, Climatic changes, Water level, Isostasy, Periodic variations, Geochronology, Shoreline modification, Greenland—Northeast Water Polynya

51-4311
Present and past vegetation in the high arctic, easternmost North Greenland and the relation to the Northeast Water Polynya.
Bay, C., Fredskild, B., *Journal of marine systems,* Jan. 1997, 10(1-4), p.35-39, 5 refs.
Paleoecology, Paleobotany, Vegetation patterns, Deserts, Shores, Polynyas, Statistical analysis, Classifications, Palynology, Quaternary deposits, Landscape development, Greenland—Northeast Water Polynya

51-4312
Summary of the formation and seasonal progression of the Northeast Water Polynya.
Minnett, P.J., et al, *Journal of marine systems,* Jan. 1997, 10(1-4), p.79-85, 18 refs.
Oceanography, Sea ice distribution, Ice surveys, Spaceborne photography, Ice formation, Seasonal variations, Polynyas, Fast ice, Ice shelves, Heat balance, Ice melting, Greenland—Northeast Water Polynya

51-4313
Passive microwave observations of the Northeast Water Polynya interannual variability: 1978-1994.
Böhn, E., Hopkins, T.S., Minnett, P.J., *Journal of marine systems,* Jan. 1997, 10(1-4), p.87-98, 16 refs.
Oceanography, Sea ice distribution, Ice surveys, Spaceborne photography, Radiometry, Brightness, Polynyas, Seasonal variations, Air ice water interaction, Wind factors, Cloud cover, Heat balance, Greenland—Northeast Water Polynya

51-4314
Note on Norske Ø Ice Barrier, (northeast Greenland), viewed by Landsat 5 TM.
Schneider, W., Budéus, G., *Journal of marine systems,* Jan. 1997, 10(1-4), p.99-106, 9 refs.
Oceanography, Sea ice distribution, Ice surveys, Spaceborne photography, LANDSAT, Radiometry, Photointerpretation, Fast ice, Pack ice, Bottom ice, Greenland—Norske Ø Ice Barrier

51-4315
Summary of the Northeast Water Polynya formation and development (Greenland Sea).
Schneider, W., Budéus, G., *Journal of marine systems,* Jan. 1997, 10(1-4), p.107-122, 21 refs.
Oceanography, Sea ice distribution, Polynyas, Air ice water interaction, Heat balance, Ice formation, Ice melting, Wind factors, Fast ice, Ocean currents, Ice cover effect, Seasonal variations, Greenland—Northeast Water Polynya

51-4316
Distribution and exchange of water masses in the Northeast Water Polynya (Greenland Sea).
Budéus, G., Schneider, W., Kattner, G., *Journal of marine systems,* Jan. 1997, 10(1-4), p.123-138, 16 refs.
Oceanography, Sea ice distribution, Polynyas, Air ice water interaction, Ocean currents, Hydrography, Nutrient cycle, Water transport, Stratification, Turbulent diffusion, Classifications, Greenland—Northeast Water Polynya

51-4317
Water mass characteristics of the Northeast Water Polynya: *Polar Sea* data 1992-1993.
Bignami, F., Hopkins, T.S., *Journal of marine systems,* Jan. 1997, 10(1-4), p.139-156, 24 refs.
Oceanographic surveys, Sea ice distribution, Ocean currents, Hydrography, Polynyas, Ice air interface, Ablation, Water temperature, Stratification, Convection, Heat balance, Seasonal variations, Greenland—Northeast Water Polynya

51-4318
Winter intensification and water mass evolution from yearlong current meters in the Northeast Water Polynya.
Topp, R., Johnson, M., *Journal of marine systems,* Jan. 1997, 10(1-4), p.157-173, 18 refs.
Oceanography, Ocean currents, Polynyas, Air ice water interaction, Seasonal variations, Hydrography, Moorings, Velocity measurement, Advection, Ice formation, Ice melting, Ice cover effect, Statistical analysis, Greenland—Northeast Water Polynya

51-4319
Tritium-^{3}He ages of deep water in the NEW Polynya.
Top, Z., Bignami, F., Hopkins, T., *Journal of marine systems,* Jan. 1997, 10(1-4), p.175-184, 21 refs.
Oceanography, Polynyas, Air ice water interaction, Hydrography, Water chemistry, Ocean currents, Water transport, Turbulent exchange, Isotope analysis, Radioactive age determination, Solubility, Statistical analysis, Greenland—Northeast Water Polynya

51-4320
Nutrient status of the Northeast Water Polynya.
Kattner, G., Budéus, G., *Journal of marine systems,* Jan. 1997, 10(1-4), p.185-197, 16 refs.
Oceanographic surveys, Water chemistry, Polynyas, Sampling, Nutrient cycle, Distribution, Hydrography, Biomass, Ecosystems, Plankton, Greenland—Northeast Water Polynya

51-4321
New production in the Northeast Water Polynya: 1993.
Smith, W., Jr., Gosselin, M., Legendre, L., Wallace, D., Daly, K., Kattner, G., *Journal of marine systems,* Jan. 1997, 10(1-4), p.199-209, 31 refs.
Oceanographic surveys, Biomass, Nutrient cycle, Polynyas, Water chemistry, Chemical properties, Plankton, Sampling, Seasonal variations, Statistical analysis, Ice cover effect, Greenland—Northeast Water Polynya

51-4322
Distribution of diatoms in the Northeast Water Polynya, Greenland.
von Quillfeldt, C.H., *Journal of marine systems,* Jan. 1997, 10(1-4), p.211-240, Refs. p.238-240.
Oceanography, Marine biology, Ecosystems, Biomass, Polynyas, Sea ice distribution, Ice surface, Ice composition, Ponds, Meltwater, Algae, Sampling, Classifications, Ice water interface, Greenland—Northeast Water Polynya

51-4323
Autotrophic flagellates and diatoms in the Northeast Water Polynya, Greenland: summer 1993.
Booth, B.C., Smith, W.O., Jr., *Journal of marine systems,* Jan. 1997, 10(1-4), p.241-261, Refs. p.259-261.
Marine biology, Oceanography, Polynyas, Ecosystems, Biomass, Plankton, Algae, Classifications, Sampling, Nutrient cycle, Statistical analysis, Ice cover effect, Greenland—Northeast Water Polynya

51-4324

Species of *Thaumatomastix* (Thaumatomastigidae, Protista incertae sedis) from the arctic sea ice biota (North-East Water Polynya, NE Greenland).

Thomsen, H.A., Ikävalko, J., *Journal of marine systems,* Jan. 1997, 10(1-4), p.263-277, 18 refs.

Marine biology, Microbiology, Polynyas, Ice composition, Meltwater, Biomass, Sampling, Scanning electron microscopy, Microstructure, Classifications, Greenland—Northeast Water Polynya

51-4325

Distribution of zooplankton in the Northeast Water Polynya during summer 1992.

Ashjian, C., Smith, S., Bignami, F., Hopkins, T., Lane, P., *Journal of marine systems,* Jan. 1997, 10(1-4), p.279-298, 40 refs.

Marine biology, Oceanographic surveys, Polynyas, Biomass, Plankton, Distribution, Ecosystems, Sampling, Classifications, Statistical analysis, Greenland—Northeast Water Polynya

51-4326

Distribution, reproduction and development of *Calanus* species in the Northeast Water Polynya in relation to environmental conditions.

Hirche, H.J., Kwasniewski, S., *Journal of marine systems,* Jan. 1997, 10(1-4), p.299-317, 42 refs.

Marine biology, Oceanographic surveys, Polynyas, Plankton, Biomass, Ecosystems, Sampling, Nutrient cycle, Chlorophylls, Ice bottom surface, Ice water interface, Ice cover effect, Greenland—Northeast Water Polynya

51-4327

Flux of particulate matter through copepods in the Northeast Water Polynya.

Daly, K.L., *Journal of marine systems,* Jan. 1997, 10(1-4), p.319-342, Refs. p.339-342.

Marine biology, Oceanographic surveys, Polynyas, Biomass, Plankton, Ecology, Sedimentation, Water chemistry, Organic nuclei, Nutrient cycle, Sampling, Statistical analysis, Greenland—Northeast Water Polynya

51-4328

Meroplankton abundance in the Northeast Water Polynya: insights from oceanographic parameters and benthic abundance patterns.

Clough, L.M., Ambrose, W.G., Jr., Ashjian, C.J., Piepenburg, D., Renaud, P.E., Smith, S.L., *Journal of marine systems,* Jan. 1997, 10(1-4), p.343-357, Refs. p.355-357.

Marine biology, Plankton, Biomass, Distribution, Classifications, Ecosystems, Oceanographic surveys, Sampling, Polynyas, Ocean bottom, Hydrography, Statistical analysis, Correlation, Greenland—Northeast Water Polynya

51-4329

Seasonal variability of sediment trap collections in the Northeast Water polynya. Part 1: sea-ice parameters and particle flux.

Ramseier, R.O., Bauerfeind, E., Garrity, C., Walsh, I.D., *Journal of marine systems,* Jan. 1997, 10(1-4), p.359-369, 39 refs.

Oceanography, Polynyas, Ice conditions, Sedimentation, Particles, Turbulent diffusion, Air ice water interaction, Ice cover effect, Ice formation, Ice melting, Sampling, Radiometry, Seasonal variations, Greenland—Northeast Water Polynya

51-4330

Seasonal variability of sediment trap collections in the Northeast Water Polynya. Part 2. Biochemical and microscopic composition of sedimenting matter.

Bauerfeind, E., Garrity, C., Krumbholz, M., Ramseier, R.O., Voß, M., *Journal of marine systems,* Jan. 1997, 10(1-4), p.371-389, Refs. p.387-389.

Oceanography, Sedimentation, Biomass, Polynyas, Particles, Organic nuclei, Nutrient cycle, Plankton, Classifications, Sampling, Seasonal variations, Ice cover effect, Greenland—Northeast Water Polynya

51-4331

Annual fluxes of particulate chemical trace compounds during the North-East Water Polynya experiment.

Schüßler, U., Schulz-Bull, D.E., Bauerfeind, E., *Journal of marine systems,* Jan. 1997, 10(1-4), p.391-400, 26 refs.

Oceanography, Water chemistry, Polynyas, Sedimentation, Particles, Organic nuclei, Lithology, Geochemical cycles, Sampling, Ice cover effect, Greenland—Northeast Water Polynya

51-4332

^{210}Pb and ^{239,240}Bu in the Northeast Water Polynya, Greenland: particle dynamics and sediment mixing rates.

Roberts, K.A., Cochran, J.K., Barnes, C., *Journal of marine systems,* Jan. 1997, 10(1-4), p.401-413, 32 refs.

Oceanography, Water chemistry, Isotope analysis, Sedimentation, Bottom sediment, Particles, Biomass, Turbulent diffusion, Polynyas, Sampling, Geochemical cycles, Scavenging, Mass balance, Greenland—Northeast Water Polynya

51-4333

Spatial distribution of particle composition and microbial activity in benthic boundary layer (BBL) of the Northeast Water Polynya.

Ritzrau, W., Thomsen, L., *Journal of marine systems,* Jan. 1997, 10(1-4), p.415-428, 36 refs.

Oceanography, Polynyas, Marine biology, Microbiology, Bacteria, Ecosystems, Ocean bottom, Nutrient cycle, Particles, Suspended sediments, Sampling, Advection, Ice cover effect, Greenland—Northeast Water Polynya

51-4334

Coastal edge of the Northeast Water polynya in spring 1993.

Weslawski, J.M., Wiktor, J., Koszteyn, J., Zajaczkowski, M., Wieczorek, P., Kotwicki, L., *Journal of marine systems,* Jan. 1997, 10(1-4), p.429-444, 49 refs.

Oceanography, Polynyas, Fast ice, Ice edge, Ice water interface, Marine biology, Nutrient cycle, Ocean bottom, Biomass, Classifications, Plankton, Sampling, Greenland—Northeast Water Polynya

51-4335

Spatial and temporal distribution patterns of benthic foraminifera in the Northeast Water Polynya.

Ahrens, M.J., Graf, G., Altenbach, A.V., *Journal of marine systems,* Jan. 1997, 10(1-4), p.445-465, Refs. p.464-465.

Oceanography, Marine biology, Biomass, Polynyas, Bottom sediment, Distribution, Classifications, Coring, Sampling, Statistical analysis, Greenland—Northeast Water Polynya

51-4336

Benthic community patterns reflect water column processes in the Northeast Water Polynya (Greenland).

Piepenburg, D., Ambrose, W.G., Jr., Brandt, A., Renaud, P.E., Ahrens, M.J., Jensen, P., *Journal of marine systems,* Jan. 1997, 10(1-4), p.467-482, 47 refs.

Oceanography, Marine biology, Ocean bottom, Bottom sediment, Ecosystems, Polynyas, Biomass, Sampling, Distribution, Classifications, Statistical analysis, Greenland—Northeast Water Polynya

51-4337

Does a pulsed food supply to the benthos affect polychaete recruitment patterns in the Northeast Water Polynya?

Ambrose, W.G., Jr., Renaud, P.E., *Journal of marine systems,* Jan. 1997, 10(1-4), p.483-495, Refs. p.493-495.

Oceanography, Polynyas, Marine biology, Ocean bottom, Biomass, Sedimentation, Bottom sediment, Nutrient cycle, Chlorophylls, Seasonal variations, Sampling, Coring, Greenland—Northeast Water Polynya

51-4338

Sediment community biomass and respiration in the Northeast Water Polynya, Greenland: a numerical simulation of benthic lander and spade core data.

Rowe, G.T., et al, *Journal of marine systems,* Jan. 1997, 10(1-4), p.497-515, Refs. p.513-515.

Oceanography, Polynyas, Bottom sediment, Biomass, Classifications, Ecosystems, Coring, Sampling, Oxygen, Ice cover effect, Nutrient cycle, Seasonal variations, Simulation, Greenland—Northeast Water Polynya

51-4339

Expedition ANTARKTIS-XII of RV *Polarstern* in 1995; Report of Leg ANT-XII/3. [Die Expedition ANTARKTIS-XII mit *Polarstern* 1995; Bericht vom Fahrtabschnitt ANT-XII/3]

Jokat, W., ed, Oerter, H., ed, *Berichte zur Polarforschung,* 1997, No.219, 188p., In German with English summary. Refs. p.166-169.

Ice cores, Sea ice, Ice cover thickness, Mass balance, Weather stations, Geomagnetism, Logistics, Antarctica—Berkner Island, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf, Antarctica—Weddell Sea

The leg ANT XII/3 sailed 11,000 nm from Cape Town to Punta Arenas, via the Weddell Sea with numerous stops along the way to provide logistic support to investigations at Drescher Inlet of Weddell seals feeding behavior and of the microorganic life directly below the sea ice. The major group of glaciologists and geophysicists was engaged in extensive programs of ice dynamics, and mass balance of the Filchner and Ronne Ice Shelves, collecting seismic, gravity, and tiltmeter data in addition to radar data. Two new ice cores were drilled atop Berkner Island to depths of 100m and 180m. Cores are expected to produce climatic data covering about 1,000 yrs. The aerogeophysical program based at Filchner Station provided support for grounding line data, ice thickness measurements, and magnetic data across Ronne Ice Sheet and Berkner I. CTD profiles of the Filchner/Ronne Ice Shelves and seismic mapping in this area were not completed due to ice conditions. Four automatic weather stations were deployed at Berkner and Filchner Stations and at the Grounding Line.

51-4340

West antarctic ice sheet collapse.

Bindschadler, R., Bentley, C.R., *Science,* May 2, 1997, 276(5313), p.62-64, 10 refs.

Ice sheets, Ice creep, Ablation, Antarctica—West Antarctica

The authors are in fairly close agreement as to the present condition of the West Antarctic Ice Sheet: it is not stable. Both also agree that there is now insufficient knowledge about the area in question to make an unequivocal statement regarding its collapse or non-collapse. RB is uneasy about CRB assuming a collapse "to be a random event, occurring once in a 100,000 years." CRB maintains that there is no evidence that a massive, order of magnitude increase in glacial outflow from Antarctica is likely to occur more often than once per 100,000 year glacial cycle. The only existing model relative to a hypothetical collapse cycle is pseudorandom. For the article being discussed, see 56690 or 51-2356.

51-4341

Younger Dryas glaciation in Söderåsen, south Sweden: an analysis of meteorologic and topographic controls.

Humlum, O., *Geografiska annaler,* 1997, 79A(1-2), p.1-15, Refs. p.13-15.

Paleoclimatology, Climatic changes, Glacial geology, Geomorphology, Rock glaciers, Glaciation, Glacial meteorology, Snowdrifts, Snow line, Snow cover effect, Topographic effects, Radiation balance, Sweden—Söderåsen

51-4342

Contribution of geoelectrical investigations in the analysis of periglacial and glacial landforms in ice free areas of the Northern Foothills (Northern Victoria Land, Antarctica).

Guglielmin, M., Biasini, A., Smiraglia, C., *Geografiska annaler,* 1997, 79A(1-2), p.17-24, 14 refs.

Glacial geology, Geomorphology, Landforms, Ground ice, Radio echo soundings, Periglacial processes, Rock glaciers, Subsea permafrost, Permafrost structure, Classifications, Antarctica—Victoria Land

All periglacial and glacial landforms investigated in the Northern Foothills, Northern Victoria Land, have a very thin active layer overlying a thin permafrost layer, characterized by electrical resistivities ranging between 13 and 50 kΩm and by different thicknesses. Below this surficial layer, different types of ground ice were detected. These different types of ground ice permitted ice-cored

rock glaciers to be distinguished from ice-cemented rock glaciers, subsea permafrost to be identified in some raised beaches, and other interpretations to be suggested about a debris-covered glacier. These results have been obtained by vertical electrical soundings (VES) carried out in ice-free areas of the Northern Foothills, near Terra Nova Bay Station during the tenth national Italian expedition in Antarctica (1994-95). Electrical prospection can be considered a good means for understanding the origins of landforms in ice-free areas of Antarctica and for making a contribution to the palaeoenvironmental reconstruction of this continent. (Auth. mod.)

51-4343

Influence of geomorphologic heritage on present nival erosion: Peñalara, Spain.

Palacios, D., Sánchez-Colomer, M.G., *Geografiska annaler,* 1997, 79A(1-2), p.25-40, 45 refs.

Geomorphology, Nivation, Snow erosion, Snow cover effect, Mountain soils, Cirques, Landforms, Weathering, Snow accumulation, Lithology, Spain—Peñalara

51-4344

Genetically complex and morphologically diverse pingos in the Fish Lake area of South West Banks Island, N.W.T., Canada.

Gurney, D.S., Worsley, P., *Geografiska annaler,* 1997, 79A(1-2), p.41-56, 43 refs.

Landforms, Arctic landscapes, Geocryology, Geomorphology, Pingos, Classifications, Ground ice, Permafrost beneath lakes, Taliks beneath rivers, Mapping, Hydraulics, Canada—Northwest Territories—South West Banks Island

51-4345

Genesis of an elongated ridge at Jæren, southwest Norway: drumlin or marginal moraine?

Janocko, J., *Geografiska annaler,* 1997, 79A(1-2), p.57-66, 29 refs.

Glacial geology, Geomorphology, Landforms, Moraines, Classifications, Tectonics, Stratigraphy, Ice push, Outwash, Ice solid interface, Deformation, Norway

51-4346

Shorelines of the Uppsala esker east-central Sweden: their use as indicators of regional differences in shore displacement.

Åse, L.E., *Geografiska annaler,* 1997, 79A(1-2), p.67-81, 28 refs.

Geomorphology, Pleistocene, Subarctic landscapes, Lakes, Shoreline modification, Glacial geology, Glacial deposits, Terraces, Glacial erosion, Isostasy, Sweden

51-4347

Scenarios for future climate change: effects on frost occurrence and severity in the maritime uplands of northern England.

Pepin, N.C., *Geografiska annaler,* 1997, 79A(1-2), p.121-137, Refs. p.135-136.

Climatology, Climatic changes, Global warming, Air flow, Frost, Freezing indexes, Degree days, Air temperature, Diurnal variations, Long range forecasting, Mathematical models, Statistical analysis, United Kingdom—England

51-4348

Evaluation of ERS.SAR images in the operational mapping of sea ice in the Greenland waters.

Gill, R.S., Valeur, H.H., Nielsen, P., *SPIE—The International Society for Optical Engineering. Proceedings,* 1995, Vol.2586, Global process monitoring and remote sensing of the ocean and sea ice. Edited by D.W. Deering et al, p.134-145, 5 refs.

DLC GC10.4.R4 G57

Oceanography, Subpolar regions, Ice surveys, Ice detection, Ice edge, Sea ice distribution, Aerial surveys, Spaceborne photography, Synthetic aperture radar, Sensor mapping, Image processing, Photointerpretation, Greenland

51-4349

Barents Sea: the physical-biological connection.

Sakshaug, E., Bruum Memorial Lectures, 1991. Modelling and Prediction in Marine Science and Intergovernmental Oceanographic Commission. Technical series. No.39, Paris, UNESCO, 1992, p.23-26.

DLC GC10.4.M36 M64

Oceanography, Turbulent diffusion, Marine biology, Biomass, Plankton, Sea ice distribution, Air ice water interaction, Ecosystems, Nutrient cycle, Seasonal variations, Barents Sea

51-4350

Day-to-night cloudiness change of cloud types inferred from split window measurements aboard NOAA polar-orbiting satellites.

Inoue, T., *Meteorological Society of Japan. Journal,* Feb. 1997, 75(1), p.59-66, With Japanese summary. 14 refs.

Climatology, Cloud cover, Optical properties, Classifications, Remote sensing, Radiometry, Infrared reconnaissance, Ice crystals, Ice detection, Diurnal variations

51-4351

Distribution characteristics of clouds over East Antarctica in 1987 obtained from AVHRR.

Murata, A., Yamanouchi, T., *Meteorological Society of Japan. Journal,* Feb. 1997, 75(1), p.81-93, With Japanese summary. 31 refs.

Climatology, Polar atmospheres, Cloud cover, Distribution, Radiometry, Detection, Brightness, Radiation balance, Transparence, Snow cover effect, Antarctica—East Antarctica

Detection of clouds in the polar regions involves many difficulties on account of the high albedo and low temperature of the snow and ice covered ground surface. Discrimination of clouds was done using AVHRR split window channel data. Brightness temperature differences were one of the indices of thin clouds; the correlation of the brightness temperature difference and the brightness temperature itself was used. The cloud analysis was done from daily NOAA-9 data for 13 months from Jan. 1987 to Jan. 1988, received and processed at Showa Station. Spatial and temporal distribution characteristics of clouds over the East Antarctic continent are discussed. Within the interior, cloud amounts were liable to be higher over the western slope facing the Weddell Sea compared to the eastern slope. An oscillation of about 7 or 15 days in the time variation of clouds was noticeable in most regions. Comparing the brightness temperature for clear and cloudy sky, the radiative effect of clouds at the top of the atmosphere was found to be negative (cooling) in winter in the interior, and small positive (heating) in the longwave in summer months over the whole area. (Auth. mod.)

51-4352

Simulation of a large positive CO_2 anomaly over the Canadian Arctic Archipelago.

Yuen, C.W., Higuchi, K., Trivett, N.B.A., Cho, H.R., *Meteorological Society of Japan. Journal,* Dec. 1996, 74(6), p.781-795, With Japanese summary. 24 refs.

Climatology, Air pollution, Atmospheric composition, Carbon dioxide, Polar atmospheres, Atmospheric circulation, Vapor transfer, Advection, Turbulent diffusion, Simulation, Profiles, Canada—Northwest Territories—Ellesmere Island

51-4353

Sensitivity experiments on the orographic snowfall over the mountainous region of northern Japan.

Saito, K., Murakami, M., Matsuo, T., Mizuno, H., *Meteorological Society of Japan. Journal,* Dec. 1996, 74(6), p.797-813, With Japanese summary. 39 refs.

Precipitation (meteorology), Snowfall, Cloud physics, Topographic effects, Turbulent diffusion, Ice water interface, Snow pellets, Ice crystal growth, Heterogeneous nucleation, Weather modification, Cloud seeding, Simulation, Mathematical models, Japan

51-4354

Sensitivity of a simulated water cycle to a runoff process with atmospheric feedback.

Emori, S., Abe, K., Numaguchi, A., Mitsumoto, S., *Meteorological Society of Japan. Journal,* Dec. 1996, 74(6), p.815-832, With Japanese summary. 33 refs.

Climatology, Hydrologic cycle, Moisture transfer, Atmospheric boundary layer, Runoff, Snow hydrology, Snowmelt, Surface drainage, Evaporation, Mathematical models, Simulation, Seasonal variations

51-4355

Comparison of the simulated response to the regional snow mass anomalies over Tibet, eastern Europe, and Siberia.

Ose, T., *Meteorological Society of Japan. Journal,* Dec. 1996, 74(6), p.845-866, With Japanese summary. 33 refs.

Climatology, Atmospheric circulation, Cooling, Precipitation (meteorology), Snowfall, Mass balance, Snow cover distribution, Snow cover effect, Albedo, Snow air interface, Seasonal variations, Simulation, China—Tibet, Russia—Siberia

51-4356

Recent abrupt intensification of the northern polar vortex since 1988.

Tanaka, H.L., Kanohgi, R., Yasunari, T., *Meteorological Society of Japan. Journal,* Dec. 1996, 74(6), p.947-954, With Japanese summary. 15 refs.

Climatology, Climatic changes, Atmospheric circulation, Atmospheric pressure, Wind direction, Sea ice distribution, Drift, Statistical analysis, Air ice water interaction

51-4357

Effect of ice on the generation of a generalized potential vorticity.

Rivas Soriano, L.J., García Díez, E.L., *Journal of the atmospheric sciences,* May 15, 1997, 54(10), p.1385-1387, 9 refs.

Cloud physics, Atmospheric circulation, Fluid dynamics, Ice formation, Freezing, Condensation, Latent heat, Advection, Air temperature, Temperature variations, Thermodynamics, Mathematical models

51-4358

Evaluation of frost resistance tests for carbonate aggregates.

Koubaa, A., Snyder, M.B., *Transportation research record,* Nov. 1996, No.1547, p.35-45, 28 refs.

Pavements, Concrete aggregates, Gravel, Porosity, Concrete durability, Frost action, Frost resistance, Freeze thaw tests, Mechanical properties, Elastic properties, Forecasting, Standards

51-4359

Characterization of metals and solids in urban highway winter snow and spring rainfall-runoff.

Sansalone, J.J., Buchberger, S.G., *Transportation research record,* Nov. 1996, No.1523, p.147-159, 8 refs.

Roads, Snowmelt, Snow impurities, Rain, Runoff, Solutions, Metals, Particles, Water pollution, Environmental impact, Environmental tests, Environmental protection, Sampling, Solubility

51-4360

Paleoenvironmental implications of the insoluble microparticle record in the GISP2 (Greenland) ice core during the rapidly changing climate of the Pleistocene-Holocene transition.

Zielinski, G.A., Mershon, G.R., *Geological Society of America. Bulletin,* May 1997, 109(5), p.547-559, Refs. p.558-559.

Paleoclimatology, Climatic changes, Ice sheets, Ice cores, Ice composition, Particles, Aerosols, Dust, Grain size, Particle size distribution, Sedimentation, Geochronology, Statistical analysis, Greenland

51-4361

Vitrification and structure relaxation of a water-swollen protein, wheat gluten and the thermodynamics of its water-protein←→ice equilibrium.

Johari, G.P., Sartor, G., *Chemical Society, London. Faraday transactions,* Nov. 21, 1996, 92(21), p.4521-4531, 52 refs.

Ice physics, Polymers, Solutions, Frozen liquids, Hydrogen bonds, Hydrates, Molecular energy levels, Phase transformations, Ice formation, Ice water interface, Thermodynamic properties, Temperature measurement, Liquid phases

51-4362

Doing more with less: zero velocity deicer spreaders.

Wald, K., *Public works,* July 1996, 127(8), p.32-33.

Winter maintenance, Road icing, Ice removal, Snow removal equipment, Salting, Cost analysis, Sediment transport, Velocity, Performance, Environmental protection

51-4363

Modern electronics aid snow fighting efforts.

Dickinson, J., *Public works,* July 1996, 127(8), p.48-49.

Snowstorms, Roads, Winter maintenance, Snow removal equipment, Radio communication, Computer applications, Weather forecasting, Logistics

51-4364

Maximum dimension of ice-rock bodies formed in liquid flow past a linear chain of cold sources.

Egorov, A.G., Mukhamadullina, G.I., *Fluid dynamics,* Jan. 1997, 31(4), p.628-630, Translated from Rossiĭskaia akademiia nauk. Izvestiia. Mekhanika zhidkosti i gaza. 2 refs.

Soil freezing, Frozen ground mechanics, Physical properties, Ice solid interface, Porous materials, Frozen rocks, Fluid flow, Analysis (mathematics), Heat flux

51-4365

Conductor twisting reduces galloping.

Pearson, D., Malone, T., *Transmission & distribution world,* May 1996, 48(5), p.66,68,71,72.

Power line icing, Oscillations, Ice cover effect, Ice solid interface, Damping, Ice removal

51-4366

Hydrometeorological approach to the forecasting of inflows to alpine lakes.

McGowan, H.A., Sturman, A.P., *Physical geography,* Nov.-Dec. 1996, 17(6), p.513-533, Refs. p.530-533.

Watersheds, Alpine landscapes, Limnology, Synoptic meteorology, Precipitation (meteorology), Lake water, Surface drainage, Snow hydrology, Atmospheric circulation, Snowmelt, Glacier melting, Snow water equivalent, Forecasting, Seasonal variations, Statistical analysis, New Zealand

51-4367

Persistence of metribuzin and metabolites in two subarctic soils.

Conn, J.S., Koskinen, W.C., Werdin, N.R., Graham, J.S., *Journal of environmental quality,* Sep.-Oct. 1996, 25(5), p.1048-1053, 20 refs.

Soil pollution, Soil tests, Organic soils, Hydrocarbons, Environmental tests, Subarctic landscapes, Soil water, Leaching, Degradation, Chemical analysis, Carbon isotopes, Isotope analysis

51-4368

Preliminary results of the first scientific drilling on Lake Baikal, Buguldeika site, southeastern Siberia.

BDP-93 Baikal Drilling Project Members, *Quaternary international,* Jan. 1997, Vol.37, p.3-17, 28 refs.

Paleoclimatology, Pleistocene, Watersheds, Lacustrine deposits, Quaternary deposits, Drill core analysis, Sedimentation, Remanent magnetism, Palynology, Tectonics, Seismic reflection, Radioactive age determination, Russia—Baykal, Lake

51-4369

High resolution record of paleoclimate since the Little Ice Age from the Tibetan ice cores.

Yao, T.D., Shi, Y.F., Thompson, L.G., *Quaternary international,* Jan. 1997, Vol.37, p.19-23, 8 refs.

Paleoclimatology, Climatic changes, Glacier ice, Ice dating, Ice cores, Moraines, Quaternary deposits, Sampling, Oxygen isotopes, Isotope analysis, Radioactive age determination, China—Tibet

51-4370

Vegetation history of the Loess Plateau of China during the last 100,000 years based on pollen data.

Sun, X.J., Song, C.Q., Wang, F.Y., Sun, M.R., *Quaternary international,* Jan. 1997, Vol.37, p.25-36, 20 refs.

Pleistocene, Paleoecology, Paleobotany, Palynology, Loess, Quaternary deposits, Sedimentation, Vegetation patterns, Stratigraphy, Radioactive age determination, Correlation, China—Loess Plateau

51-4371

Stable isotope composition of the carbonate concretion and loess and climate change.

Han, J.M., Keppens, E., Liu, T.S., Paepe, R., Jiang, W.Y., *Quaternary international,* Jan. 1997, Vol.37, p.37-43, 38 refs.

Paleoclimatology, Climatic changes, Quaternary deposits, Soil formation, Loess, Soil cement, Isotope analysis, Carbon isotopes, Geochemistry, Statistical analysis

51-4372

Snowline elevation and eolian dust flux in the Japanese Islands during Isotope Stages 2 and 4.

Ono, Y., Naruse, T., *Quaternary international,* Jan. 1997, Vol.37, p.45-54, Refs. p.53-54.

Paleoclimatology, Quaternary deposits, Eolian soils, Loess, Snow line, Altitude, Dust, Sediment transport, Atmospheric circulation, Geochronology, Correlation, Japan

51-4373

Chemical weathering in glacial environments.

Anderson, S.P., Drever, J.I., Humphrey, N.F., *Geology,* May 1997, 25(5), p.399-402, 46 refs.

Glacial geology, Glacial hydrology, Alpine glaciation, Glacial erosion, Weathering, Sediment transport, Geochemical cycles, Ion density (concentration), Runoff, Ice cover effect, Statistical analysis

51-4374

Atmospheric $_pCO_2$ threshold for glaciation in the Late Ordovician.

Gibbs, M.T., Barron, E.J., Kump, L.R., *Geology,* May 1997, 25(5), p.447-450, 35 refs.

Pleistocene, Paleoclimatology, Greenhouse effect, Glaciation, Glacier oscillation, Atmospheric composition, Carbon dioxide, Solar radiation, Snow cover distribution, Simulation

51-4375

Overconsolidated section on the Yermak Plateau, Arctic Ocean: Ice sheet grounding prior to ca. 660 ka: correction. *Geology,* May 1997, 25(5), p.480, 1 ref. For pertinent paper see 51-3630.

Marine geology, Sea ice, Grounded ice, Ocean bottom, Sedimentation, Pleistocene, Arctic Ocean

51-4376

Temperature and plant species control over litter decomposition in Alaskan tundra.

Hobbie, S.E., *Ecological monographs,* Nov. 1996, 66(4), p.503-522, Refs. p.520-522.

Climatology, Global warming, Plant ecology, Tundra soils, Tundra vegetation, Plant tissues, Decomposition, Geochemical cycles, Soil air interface, Simulation, Statistical analysis, Temperature effects

51-4377

Solidification processes of solutions.

Viskanta, R., Bianchi, M.V.A., Critser, J.K., Gao, D., *Cryobiology,* June 1997, 34(4), p.348-362, 40 refs.

Cryobiology, Preserving, Solutions, Salt water, Phase transformations, Solidification, Ice formation, Porous materials, Ice water interface, Heat transfer, Stefan problem, Simulation, Cooling rate

51-4378

Novel microwave technology for cryopreservation of biomaterials by suppression of apparent ice formation.

Jackson, T.H., Ungan, A., Critser, J.K., Gao, D.Y., *Cryobiology,* June 1997, 34(4), p.363-372, 26 refs.

Cryobiology, Preserving, Microwaves, Solutions, Ice formation, Ice control, Antifreezes, Cooling rate, Temperature control, Electric fields, Microwaves, Radiation absorption

51-4379

Structure of the Martian north polar cap and vernal hood systems a L_S 61°-66° of the 1995 apparition.

Warell, J., *Earth, moon and planets,* 1996/1997, 74(2), p.93-107, 41 refs.

Mars (planet), Climatology, Extraterrestrial ice, Ice sheets, Ice sublimation, Polar regions, Remote sensing, Mapping, Image processing, Cloud cover, Seasonal variations, Tectonics

51-4380

Change of microplankton community structure in response to fertilization of an arctic lake.

Rublee, P.A., Bettez, N., *Hydrobiologia,* Sep. 22, 1995, 312(3), p.183-190, 30 refs.

Limnology, Biomass, Plankton, Ecosystems, Lake water, Water chemistry, Nutrient cycle, Sampling, United States—Alaska

51-4381

Continuum-mechanical formulation for shallow polythermal ice sheets.

Greve, R., *Royal Society of London. Philosophical transactions A,* May 15, 1997, 355(1726), p.921-974, Refs. p.972-974.

Glaciology, Ice sheets, Ice mechanics, Ice thermal properties, Grounded ice, Glacier mass balance, Ice temperature, Ice models, Glacier flow, Mathematical models, Thermodynamics, Ice water interface, Ice heat flux, Bottom ice

51-4382

Structural changes in the forest-tundra ecotone: a dynamic process.

Hofgaard, A., NATO Advanced Research Workshop on Past and Future Rapid Environmental Changes: the Spatial and Evolutionary Responses of Terrestrial Biota, June 26-30, 1995. Proceedings. Edited by B. Huntley et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.47, Berlin, Springer-Verlag, 1997, p.255-263, 36 refs.

DLC QE720.P38

Tundra vegetation, Forest ecosystems, Vegetation patterns, Forest lines, Climatology, Climatic changes, Global warming, Environmental impact, Periodic variations

51-4383

Glaciology.

Andrews, J.T., *Geotimes,* Feb. 1997, 42(2), p.26-27.

Glaciology, Research projects, Sedimentation, Glacial erosion, Volcanoes

51-4384

Structural geology and sedimentology of push moraines—processes of soft sediment deformation in a glacial environment and the distribution of glaciotectonic styles.

van der Wateren, F.M., *Mededelingen rijks geologische dienst,* Sep. 29, 1995, No.54, 167p., Refs. p.151-162.

Glacial geology, Ice push, Outwash, Glacier beds, Moraines, Geomorphology, Sediment transport, Tectonics, Stress concentration, Ice solid interface, Substrates, Deformation

51-4385
Snowfall and snowmelt in the high mountains of Crete—climatic, hydrologic and geomorphic effects. [Schneefall und Tauen in Kreta Hochgebirgen—klimatologische, hydrologische und geomorphologische Effekte]
Hempel, L., *Petermanns Geographische Mitteilungen,* 1997, 141(1), p.17-34, In German with English and Russian summaries. 24 refs.
Climatology, Geomorphology, Mountain soils, Soil erosion, Precipitation (meteorology), Snow hydrology, Snowfall, Snowmelt, Meltwater, Water transport, Runoff, Greece—Crete

51-4386
Glacier dynamics in western Norway—chronology and causes of the present ice advance at Jostedalsbreen. [Glaziale Dynamik in Westnorwegen—Ablauf und Ursachen des aktuellen Gletschervorstoßes am Jostedalsbreen]
Winkler, S., Haakensen, N., Nesje, A., Rye, N., *Petermanns Geographische Mitteilungen,* 1997, 141(1), p.43-63, In German with English and Russian summaries. Refs. p.62-63.
Glaciology, Glacier surveys, Glacier oscillation, Climatic changes, Glacier mass balance, Glacial meteorology, Forecasting, Geochronology, Seasonal variations, Statistical analysis, Norway—Jostedalsbreen

51-4387
Low energy (<5 ev)F^+ and F^- ion transmission through condensed layers of water.
Akbulut, M., Madey, T.E., Nordlander, P., *Journal of chemical physics,* Feb. 15,1997, 106(7), p.2801-2810, 43 refs.
Ice physics, Amorphous ice, Water films, Monomolecular films, Ice solid interface, Adsorption, Ion diffusion, Ice spectroscopy, Spectra

51-4388
Field sampling and selecting on-site analytical methods for explosives in soil.
Crockett, A.B., Craig, H.D., Jenkins, T.F., Sisk, W.E., MP 4042, U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Report EPA/540/R-97-501, Washington, D.C., Nov. 1996, 32p., Refs. p.28-32.
Soil pollution, Soil tests, Explosives, Sampling, Detection, Environmental tests, Safety, Laboratory techniques, Chemical analysis, Standards

51-4389
Variability of microphysical parameters in high-altitude ice clouds: results of the remote sensing method.
Matrosov, S.Y., *Journal of applied meteorology,* June 1997, 36(6), p.633-648, 29 refs.
Climatology, Clouds (meteorology), Cloud physics, Radiometry, Radar echoes, Profiles, Ice crystal optics, Ice detection, Brightness, Particle size distribution, Analysis (mathematics)

51-4390
Differential doppler velocity: a radar parameter for characterizing hydrometeor size distributions.
Wilson, D.R., Illingworth, A.J., Blackman, T.M., *Journal of applied meteorology,* June 1997, 36(6), p.649-663, 19 refs.
Precipitation (meteorology), Remote sensing, Cloud physics, Radar echoes, Polarization (waves), Ice detection, Falling snow, Snowflakes, Snow melting, Spectra, Particle size distribution, Analysis (mathematics)

51-4391
Large-scale analysis of cirrus clouds from AVHRR data: assessment of both a microphysical index and the cloud-top temperature.
Giraud, V., Buriez, J.C., Fouquart, Y., Parol, F., Seze, G., *Journal of applied meteorology,* June 1997, 36(6), p.664-675, 31 refs.
Cloud cover, Classifications, Cloud physics, Radiometry, Brightness, Air temperature, Cloud height indicators, Ice detection, Particle size distribution, Radiation absorption, Ice crystal optics, Image processing, Indexes (ratios)

51-4392
Momentum, heat, and moisture budgets of the katabatic wind layer over a midlatitude glacier in summer.
Van den Broeke, M.R., *Journal of applied meteorology,* June 1997, 36(6), p.763-774, 39 refs.
Glacial meteorology, Wind (meteorology), Glacier surfaces, Turbulent boundary layer, Wind velocity, Velocity measurement, Buoyancy, Ice air interface, Moisture transfer, Heat transfer, Ice cover effect, Profiles, Analysis (mathematics)

51-4393
Numerical forecasting system for the prediction of slippery roads.
Sass, B.H., *Journal of applied meteorology,* June 1997, 36(6), p.801-817, 22 refs.
Synoptic meteorology, Road icing, Surface temperature, Winter maintenance, Ice forecasting, Mathematical models, Meteorological factors, Cloud cover, Dew point, Hoarfrost, Accuracy

51-4394
Longwave radiation on snow-covered mountainous surfaces.
Plüss, C., Ohmura, A., *Journal of applied meteorology,* June 1997, 36(6), p.818-824, 23 refs.
Atmospheric boundary layer, Radiation balance, Radiance, Snow surface temperature, Snow air interface, Radiation absorption, Snow cover effect, Mountains, Topographic effects

51-4395
Generation of internal waves by a drifting iceberg.
Vasil'eva, V.V., Pisarevskaia, L.G., Shishkina, O.D., *Izvestiya. Atmospheric and oceanic physics,* June 1996, 31(6), p.809-817, Translated from Izvestiia. Fizika atmosfery i okeana. 8 refs.
Oceanography, Sea ice, Icebergs, Drift, Ice water interface, Wave propagation, Gravity waves, Hydrodynamics, Velocity measurement, Mathematical models, Ice cover effect

51-4396
Influence of viscoelastic properties of ice on three-dimensional surface waves.
Bukatov, A.E., Solomakha, T.A., *Izvestiya. Atmospheric and oceanic physics,* June 1996, 31(6), p.818-823, Translated from Izvestiia. Fizika atmosfery i okeana. 12 refs.
Oceanography, Sea ice, Floating ice, Ice water interface, Wave propagation, Gravity waves, Oscillations, Water pressure, Viscoelasticity, Hydrodynamics, Ice cover effect, Snow cover effect, Attenuation, Analysis (mathematics)

51-4397
Faint young sun climatic paradox: influence of the continental configuration and of the seasonal cycle on the climatic stability.
Longdoz, B., François, L.M., *Global and planetary change,* Feb. 1997, 14(3-4), p.97-112, 49 refs.
Paleoclimatology, Climatic changes, Insolation, Hydrologic cycle, Seasonal variations, Glaciation, Sea ice distribution, Snow cover distribution, Albedo, Ice cover effect, Radiation balance, Mathematical models

51-4398
Role of diatoms, dissolved silicate and antarctic glaciation in glacial/interglacial climatic changes: a hypothesis.
Pollock, D.E., *Global and planetary change,* Feb. 1997, 14(3-4), p.113-125, Refs. p.123-125.
Paleoclimatology, Climatic changes, Cooling, Air ice water interaction, Ocean currents, Sedimentation, Biomass, Algae, Geochemical cycles, Sea ice distribution, Ice air interface, Ice cover effect
A new theory is proposed to explain global cooling at the onset of Pleistocene glacial periods. Atmospheric CO_2 drawdown is considered to be the driving force behind global cooling, brought about by heightened productivity at the equatorial divergences and along continental margins, particularly in upwelling regions. Eutrophication appears to be triggered when global warming during late interglacial periods causes accelerated melting of the West Antarctic Ice Sheet. This would release large reserves of silicate-enriched subglacial meltwaters into the surrounding oceans where entrainment would take place into deep and intermediate currents forming in antarctic and subantarctic waters. Subsequent advection, mixing and upwelling of silicate-enriched deep and intermediate waters into the coastal zones and open-ocean divergences results in the proliferation of large, rapidly-sinking diatom species with a high affinity for dissolved silicate. These blooms enhance rates of recycling of N and P in upwelling regions and accelerate rates of organic carbon production, export and sequestration in shelf and slope sediments and in the deep sea. The resultant atm. CO_2 drawdown initiates global cooling. Consequent expansion of Northern Hemisphere glaciers lowers sea level, while increased temperature and pressure gradients between equatorial and polar regions intensify meridional winds. (Auth. mod.)

51-4399
New approach to paleoclimatic research using linear programming.
Kuby, M.J., Cerveny, R.S., Dorn, R.I., *Palaeogeography, palaeoclimatology, palaeoecology,* Apr. 1997, 129(3-4), p.251-267, Refs. p.266-267.
Paleoclimatology, Climatic changes, Insolation, Quaternary deposits, Radiation balance, Ice cores, Air temperature, Statistical analysis, Correlation, Mathematical models, Antarctica—Vostok Station
The authors computed 342 insolation time series for fitting to four different paleoclimatic records, including temperatures inferred from Vostok Station ice cores. Globally, high latitude insolation (60°-70° N and S) and insolation at specific times of day dominated the results. (Auth. mod.)

51-4400
Palynomorphs of ice rafted clastic sedimentary rocks in Late Quaternary glacial marine sediments of the Norwegian Sea as provenance indicators.
Bischof, J., Lund, J.J., Ecke, H.H., *Palaeogeography, palaeoclimatology, palaeoecology,* Apr. 1997, 129(3-4), p.329-360, Refs. p.357-360.
Oceanography, Quaternary deposits, Marine deposits, Sea ice distribution, Palynology, Stratigraphy, Isotope analysis, Sediment transport, Ice rafting, Ocean currents, Correlation, Sampling, Norwegian Sea, Barents Sea

51-4401
Carbon dioxide and methane exchange of a subarctic heath in response to climate change related environmental manipulations.
Christensen, T.R., Michelsen, A., Jonasson, S., Schmidt, I.K., *Oikos,* May 1997, Vol.79, p.34-44, 50 refs.
Climatology, Global warming, Greenhouse effect, Subarctic landscapes, Tundra vegetation, Plant ecology, Biomass, Nutrient cycle, Ecosystems, Soil air interface, Photosynthesis, Mosses, Carbon dioxide, Simulation

51-4402
Growth response of subarctic dwarf shrubs, *Empetrum nigrum* and *Vaccinium vitis-idaea*, to manipulated environmental conditions and species removal.
Shevtsova, A., Haukioja, E., Ojala, A., *Oikos,* Apr. 1997, Vol.78, p.440-458, Refs. p.456-458.
Plant ecology, Growth, Climatic changes, Global warming, Microclimatology, Simulation, Forest tundra, Tundra vegetation, Ecosystems, Biomass, Temperature effects, Vegetation patterns

51-4403
Winter production of CO_2 and N_2O from alpine tundra: environmental controls and relationship to inter-system C and N fluxes.
Brooks, P.S., Schmidt, S.K., Williams, M.W., *Oecologia,* Apr. 1997, 110(3), p.403-413, 46 refs.
Tundra vegetation, Ecosystems, Alpine tundra, Soil microbiology, Carbon dioxide, Vapor diffusion, Soil air interface, Snow air interface, Insulation, Snow cover effect, Seasonal variations, Biomass

51-4404
Frost resistance of building materials—modelling of critical degrees of saturation. [Byggematerialers frostbestandighed—modellering af kritiske vandmætningsgrader]
de Place Hansen, E.J., *Statens Byggeforskningsinstitut. SBI rapport,* 1996, No.268, 205p., In Danish with English summary. Refs. p.190-205.
Construction materials, Buildings, Concrete admixtures, Porous materials, Frost resistance, Degradation, Freeze thaw tests, Saturation, Stress concentration, Moisture transfer, Computerized simulation

51-4405

One Hundred Years of Glaciological Research in Italy. Meeting. [Convegno]

Cento Anni de Ricerca Glaciologica in Italia, *Geografia fisica e dinamica Quaternaria,* 1995, 18(2), Turin, Comitato Glaciologico Italiano, 1996, 352p., In Italian and English, with English and Italian summaries. Refs. passim. For selected papers see 51-4406 through 51-4428.

Glaciology, Glacier surveys, Meetings, Alpine glaciation, Mountain glaciers, Glacial hydrology, Glacier oscillation, Glacial meteorology, Climatic factors, Italy—Alps

51-4406

100 years of glaciological research in Italy. [Cento anni di ricerca glaciologica in Italia]

Malaroda, R., *Geografia fisica e dinamica quaternaria,* 1995, 18(2), Cento Anni de Ricerca Glaciologica in Italia, Oct. 19-20, 1995. Convegno, p.159-162, In Italian with English summary.

Glaciology, Mountain glaciers, Research projects, Alpine glaciation, History, Organizations, Italy

51-4407

Italian contributions to the activity of international organizations studying glacial fluctuations, 1895-1995. [Il contributo italiano all'attività degli organismi internazionali per lo studio delle fluttuazioni glaciali, 1895-1995]

Zanon, G., *Geografia fisica e dinamica quaternaria,* 1995, 18(2), Cento Anni de Ricerca Glaciologica in Italia, Oct. 19-20, 1995. Convegno, p.163-169, In Italian with English summary. 37 refs.

Glaciology, Glacier surveys, Geophysical surveys, Glacier oscillation, Research projects, Organizations, International cooperation, History, Italy

51-4408

Italian glaciological studies in regions outside Europe. [Le ricerche glaciologiche italian nelle regioni extraeuropee]

Smiraglia, C., *Geografia fisica e dinamica quaternaria,* 1995, 18(2), Cento Anni de Ricerca Glaciologica in Italia, Oct. 19-20, 1995. Convegno, p.171-180, In Italian with English summary. 51 refs.

Glaciology, Glacier surveys, Mountain glaciers, Research projects, International cooperation, History, Italy

51-4409

101 years of international snow and ice research.

Kuhn, M., *Geografia fisica e dinamica quaternaria,* 1995, 18(2), Cento Anni de Ricerca Glaciologica in Italia, Oct. 19-20, 1995. Convegno, p.181-184, With Italian summary. 9 refs.

Glaciology, Research projects, Organizations, Glacier surveys, International cooperation, History

51-4410

Alpine glaciers as climatic indicators. [I ghiacciai alpini come indicatori climatici]

Belloni, S., Pelfini, M., *Geografia fisica e dinamica quaternaria,* 1995, 18(2), Cento Anni de Ricerca Glaciologica in Italia, Oct. 19-20, 1995. Convegno, p.185-189, In Italian with English summary. 7 refs.

Mountain glaciers, Alpine glaciation, Climatic changes, Glacier mass balance, Glacier oscillation, Ice edge, Correlation, Age determination, Alps

51-4411

Glacier fluctuations and climate change detection.

Haeberli, W., *Geografia fisica e dinamica quaternaria,* 1995, 18(2), Cento Anni de Ricerca Glaciologica in Italia, Oct. 19-20, 1995. Convegno, p.191-199, With Italian summary. 49 refs.

Glaciology, Glacier oscillation, Climatic changes, Greenhouse effect, Glacier mass balance, Glacier ablation, Alpine glaciation, Surface energy, Heat balance, Photogrammetry, Topographic features

51-4412

Italian glaciers and their hydroelectric potential. [I ghiacciai italiani ed il loro potenziale idroelettrico]

Rossi, G., *Geografia fisica e dinamica quaternaria,* 1995, 18(2), Cento Anni de Ricerca Glaciologica in Italia, Oct. 19-20, 1995. Convegno, p.201-209, In Italian with English summary. 24 refs.

Mountain glaciers, Glacial hydrology, Glacier surveys, Water balance, Electric power, Reservoirs, Glacier melting, Runoff, Hydrography, Italy

51-4413

Basodino Glacier (southern Swiss Alps). [Il Ghiacciaio del Basodino, (Alpi Meridionali Svizzere)]

Aellen, M., Kappenberger, G., Casartelli, G., *Geografia fisica e dinamica quaternaria,* 1995, 18(2), Cento Anni de Ricerca Glaciologica in Italia, Oct. 19-20, 1995. Convegno, p.219-223, In Italian with English summary. 7 refs.

Mountain glaciers, Alpine glaciation, Glacier surveys, Glacial hydrology, Glacier mass balance, Glacier ablation, Seasonal variations, Global warming, Switzerland—Basodino Glacier

51-4414

Morphological and evolutive features of cryokarstic endoglacial caves. [Aspetti morfologici ed evolutivi delle cavità endoglaciali de origine criocarsica]

Badino, G., Piccini, L., *Geografia fisica e dinamica quaternaria,* 1995, 18(2), Cento Anni de Ricerca Glaciologica in Italia, Oct. 19-20, 1995. Convegno, p.225-228, In Italian with English summary. 16 refs.

Glacier surveys, Ice caves, Exploration, Glacial hydrology, Subglacial drainage, Water flow, Channels (waterways), Ice water interface

51-4415

Nine years of negative balance at the Giacciaio della Sforzellina (Alps of Lombardy, Italy). [Nove anni de bilancio negativo al Giacciaio della Sforzellina (Alpi Lombarde). Rapporti con il clima e ipostei de estinzione]

Barsanti, M., Casartelli, G., Guglielmin, M., Pelfini, M., Smiraglia, C., Stella, G., *Geografia fisica e dinamica quaternaria,* 1995, 18(2), Cento Anni de Ricerca Glaciologica in Italia, Oct. 19-20, 1995. Convegno, p.229-234, In Italian with English summary. 6 refs.

Mountain glaciers, Glacier surveys, Alpine glaciation, Cirque glaciers, Glacier oscillation, Glacial hydrology, Glacier mass balance, Glacier thickness, Radio echo soundings, Seasonal variations, Italy—Giacciaio della Sforzellina

51-4416

Discriminating between glacial and fluvioglacial drift in the Upper Gressoney Valley (Valle d'Aosta, Italy) by morphometric techniques. [Applicazione delle tecniche morfometriche al problema della distinzione dei depositi glaciali e fluvioglaciali nell'Alta Valle de Gressoney (Valle d'Aosta)]

Cortemiglia, G.C., Motta, M., *Geografia fisica e dinamica quaternaria,* 1995, 18(2), Cento Anni de Ricerca Glaciologica in Italia, Oct. 19-20, 1995. Convegno, p.245-251, In Italian with English summary. 15 refs.

Glacial geology, Glacial deposits, Moraines, Lithology, Sedimentation, Sampling, Classifications, Statistical analysis, Italy—Valle de Gressoney

51-4417

New data about the snow alimentation of the Calderone Glacier (Gran Sasso d'Italia, Appennines). [Nuovi dati sull'alimentazione nevosa del Ghiacciaio del Calderone (Gran Sasso d'Italia, Appennino Centrale)]

D'Orefice, M., Ledonne, L., Pecci, M., Smiraglia, C., Ventura, R., *Geografia fisica e dinamica quaternaria,* 1995, 18(2), Cento Anni de Ricerca Glaciologica in Italia, Oct. 19-20, 1995. Convegno, p.253-256, In Italian with English summary. 4 refs.

Glaciology, Glacier surveys, Mountain glaciers, Glacial hydrology, Snow hydrology, Snow depth, Snow water equivalent, Glacier alimentation, Glacier oscillation, Glacier melting, Seasonal variations, Italy—Apennines

51-4418

Recent evolution of glaciers in the Maritime Alps. [L'evoluzione recente dei ghiacciai delle Alpi Marittime]

Federici, P.R., Pappalardo, M., *Geografia fisica e dinamica quaternaria,* 1995, 18(2), Cento Anni de Ricerca Glaciologica in Italia, Oct. 19-20, 1995. Convegno, p.257-269, In Italian with English summary. 20 refs.

Mountain glaciers, Glacier surveys, Alpine glaciation, Glacier oscillation, Glacier tongues, Glacial meteorology, Climatic factors, Temperature effects, Statistical analysis, Alps

51-4419

Twentieth century behavior of the ice fronts in Antarctica: environmental change evidence. [Fluttuazione delle fronti dei ghiacciai galleggianti durante il XX secolo in Antartide: evidenze di cambiamenti ambientali]

Frezzotti, M., *Geografia fisica e dinamica quaternaria,* 1995, 18(2), Cento Anni di Ricerca Glaciologica in Italia, Oct. 19-20, 1995. Convegno, p.271-275, In Italian with English summary. 33 refs.

Ice shelves, Glacier melting, Glacier mass balance, Calving, Icebergs, Meltwater, Climatic factors, Antarctica—Victoria Land

A comparison of various documents, dated several years apart, has allowed the surficial ice discharge, the ice front fluctuation and the iceberg calving flux of Victoria Land coast during this century to be estimated. The Hells Gate and McMurdo Sound ice shelves and the floating glaciers of Cape Adare have undergone a significant retreat since the beginning of the 20th century. The different behavior of these floating glaciers with respect to others has been presumed to be due to increased energy available for meltwater production and to increased melting at the ice-ocean interface related to Circumpolar Deep Water. A first estimate of the mass balance of glaciers that fringe the Victoria Land coast shows a significantly positive value, despite all the uncertainties of balance measurements. (Auth.)

51-4420

Mass balance studies on the del Ghiacciaio de Fontana Bianca (Weißbrunnferner) in the Ortles-Cevedale Group. [Ricerche sul bilancio di massa del Giacciaio de Fontana Bianca (Weißbrunnferner) nel Gruppo Ortles-Cevedale]

Kaser, G., Munari, M., Noggler, B., Oberschmied, C., Valentini, P., *Geografia fisica e dinamica quaternaria,* 1995, 18(2), Cento Anni de Ricerca Glaciologica in Italia, Oct. 19-20, 1995. Convegno, p.277-280, In Italian with English summary. 10 refs.

Glacier surveys, Geophysical surveys, Mountain glaciers, Glacier mass balance, Seasonal variations, Glacier oscillation, Glacier ablation, Statistical analysis, Italy—Alps

51-4421

Research on the Pleistocene glaciation in the Apennines during the last fifty years. A bibliographic review (from 1941 to the present). [Mezzo secolo di richerche sul glacialismo quaternario dell'Appennino. Rassegna bibliografica (dal 1941 a oggi)]

Laureti, L., *Geografia fisica e dinamica quaternaria,* 1995, 18(2), Cento Anni de Ricerca Glaciologica in Italia, Oct. 19-20, 1995. Convegno, p.281-285, In Italian with English summary.

Alpine glaciation, Glacier oscillation, Pleistocene, Glacial geology, Bibliographies, Italy—Apennines

51-4422

Depth/density profiles and models from Northern Victoria Land shallow firn-cores (Antarctica). [Profili di densità e modelli profondità/densità su carote di nevato prelevate in alcuni ghiacciai della Terra Vittoria Settentrionale (Antartide)]

Maggi, V., *Geografia fisica e dinamica quaternaria,* 1995, 18(2), Cento Anni di Ricerca Glaciologica in Italia, Oct. 19-20, 1995. Convegno, p.287-294, In Italian with English summary. 19 refs.

Glacier ice, Ice density, Firn, Ice sintering, Ice cores, Profiles, Ice models, Sampling, Antarctica—Victoria Land

During the recent field seasons carried out by the Italian Antarctic Program (PNRA) 11 sites have been investigated to evaluate the annual accumulation rate in Northern Victoria Land. Fourteen shallow firn cores, 7.5 m to 21 m depth, have been drilled in different accumulation situations from the coast to the East Antarctic plateau margin, through the Transantarctic Mountains. Density profiles have been performed directly in the field and simple models have been calculated to evaluate the density gradients with depth. This work

applies a simple depth/density model at 4 cores from different geographical situations. For the deeper part of the profiles, sintering processes have been involved in the increase of density. In this situation, the temperature of the ice crystals is an important factor in grain-to-grain matter transfer. For the future drilling activities, a simple depth-density model has been applied to these 4 firn cores to try to define the close-off depth. (Auth. mod.)

51-4423

Failures induced by heavy rainfall in proglacial environment: the downcutting of neoglacial moraine of Mulinet Glacier (Upper Valle de Lanzo, western Alps). [Effetti degli eventi alluvionali nell'ambiente proglaciale: la sovraincisione della morena del Ghiacciaio del Mulinet (Stura de Valgrande, Alpi Graie)]

Mortara, G., Dutto, F., Godone, F., *Geografia fisica e dinamica quaternaria,* 1995, 18(2), Cento Anni de Ricerca Glaciologica in Italia, Oct. 19-20, 1995. Convegno, p.295-304, In Italian with English summary. 12 refs.

Glacial hydrology, Moraines, Alpine landscapes, Glacier melting, Water erosion, Flooding, Precipitation (meteorology), Mass flow, Sediment transport, Safety, Geomorphology, Alps

51-4424

Application of the accumulation/ablation ratio to the large alpine glacier: the Lys Glacier, M. Rosa. [Studio del rapporto accumulo/ablazione in un ghiacciaio alpino de grandi dimensioni: l'esempio del Ghiacciaio del Lys (Monte Rosa)]

Motta, M., *Geografia fisica e dinamica quaternaria,* 1995, 18(2), Cento Anni de Ricerca Glaciologica in Italia, Oct. 19-20, 1995. Convegno, p.305-313, In Italian with English summary. 18 refs.

Mountain glaciers, Glacier mass balance, Glacier oscillation, Glacier ablation, Seasonal variations, Glacier surveys, Snow cover structure, Snowdrifts, Snow accumulation, Snow cover effect, Wind factors, Moraines, Italy—Alps

51-4425

Isotopic contribution (^{18}C, ^{2}H, ^{3}H) in the understanding of the flow pattern in surface water and groundwater in the Aosta Valley (Italy). [Contribution isotopique (^{18}C, ^{2}H, ^{3}H) a la comprehension des mecanismes d'ecoulement des eaux de surface et des eaux souterraines en Vallee d'Aoste (Italie)]

Novel, J.P., Ravello, M., Dray, M., Pollicini, F., Zuppi, G.M., *Geografia fisica e dinamica quaternaria,* 1995, 18(2), Cento Anni de Ricerca Glaciologica in Italia, Oct. 19-20, 1995. Convegno, p.315-319, In Italian with French and English summaries. 27 refs.

Glacial hydrology, Hydrologic cycle, Runoff, Precipitation (meteorology), Mountain glaciers, Surface waters, Ground water, Water transport, Isotope analysis, Ice sublimation, Subglacial drainage, Italy—Aosta Valley

51-4426

100 years of glacier observations in Canada (1890-1990).

Ommanney, C.S.L., *Geografia fisica e dinamica quaternaria,* 1995, 18(2), Cento Anni de Ricerca Glaciologica in Italia, Oct. 19-20, 1995. Convegno, p.321-330, With Italian summary. Refs. p.326-330.

Glacier surveys, Glacier oscillation, Organizations, History, Research projects, International cooperation, Canada

51-4427

Evidence of a Pleistocene glacier on M. Catria (Marche Apennines). [Evidenze de un apparato glaciale pleistocenico sul massiccio del Catria (Appennino marchigiano)]

Savelli, D., Nesci, O., Basili, M., *Geografia fisica e dinamica quaternaria,* 1995, 18(2), Cento Anni de Ricerca Glaciologica in Italia, Oct. 19-20, 1995. Convegno, p.331-335, In Italian with English summary. 10 refs.

Glacial geology, Mountain glaciers, Quaternary deposits, Geomorphology, Landforms, Moraines, Sediment transport, Pleistocene, Glacier oscillation, Italy—Apennines

51-4428

Recent glacier behavior and climatic factors in the Aurine and Pusteresi Alps (eastern Alps). [Glacialismo recente e variazioni climatiche nelle Alpe Aurine e Pusteresi (Alpe Orientali)]

Serandrei Barbero, R., Mattana, U., Zecchetto, S., *Geografia fisica e dinamica quaternaria,* 1995, 18(2), Cento Anni de Ricerca Glaciologica in Italia, Oct. 19-20, 1995. Convegno, p.337-344, In Italian with English summary. 26 refs.

Glacier surveys, Glacier oscillation, Mountain glaciers, Glacial meteorology, Glacier tongues, Sampling, Climatic factors, Air temperature, Precipitation (meteorology), Statistical analysis, Alps

51-4429

Modelling of frost formation over a flat plate.

Ismail, K.A.R., Salinas, C.S., Advanced computational methods in heat transfer IV. Edited by L.C. Wrobel et al and International Conference on Advanced Computational Methods in Heat Transfer, 4th, Udine, Italy, July, 1996, Southampton, Computational Mechanics Publications, 1996, p.483-492, 11 refs.

DLC QC319.8.I55

Refrigeration, Plates, Hoarfrost, Phase transformations, Ice crystal growth, Ice temperature, Heat transfer, Air flow, Humidity, Ice air interface, Mathematical models, Frost forecasting, Ice solid interface

51-4430

Effect of deforestation on snowmelt in the Jizera Mountains.

Blazkova, S., Hottelet, C., Braun, L.N., Bubenickova, L., International Conference on Integrated River Basin Development, HR Wallingford, UK, Sep.13-16, 1994. Paper and Integrated river basin development. Edited by C. Kirby and W.R. White, Chichester, John Wiley & Sons Ltd., 1994, p.215-227, 21 refs.

DLC TC409.I55

Forest ecosystems, Watersheds, Revegetation, Vegetation patterns, Snow hydrology, Snowmelt, Runoff forecasting, Snow cover effect, Snow water equivalent, Environmental impact, Statistical analysis, Czech Republic—Jizera Mountains

51-4431

Snowmelt Runoff Model (SRM).

Rango, A., Computer models of watershed hydrology. Edited by V.P. Singh, Highlands Ranch, Water Resources Publications, 1995, p.477-520, 23 refs.

DLC GB980.C66

Watersheds, River basins, Runoff forecasting, Snow hydrology, Snowmelt, Snow cover distribution, LANDSAT, Degree days, Meltwater, Sensor mapping, Computerized simulation, Data processing, Computer applications, Accuracy

51-4432

SLURP model.

Kite, G.W., Computer models of watershed hydrology. Edited by V.P. Singh, Highlands Ranch, Water Resources Publications, 1995, p.521-562, Refs. p.560-562.

DLC GB980.C66

Watersheds, Snow hydrology, Snowmelt, Water balance, Runoff forecasting, Hydrography, Evapotranspiration, Remote sensing, Landscape types, Computerized simulation

51-4433

Monitoring changes in land cover induced by atmospheric pollution in the Kola Peninsula, Russia, using Landsat-MSS data.

Rees, W.G., Williams, M., *International journal of remote sensing,* May 20, 1997, 18(8), p.1703-1723, 19 refs.

Tundra terrain, Tundra vegetation, Plant ecology, Air pollution, Damage, Vegetation patterns, Sensor mapping, LANDSAT, Spaceborne photography, Landscape types, Classifications, Environmental impact, Image processing, Russia—Kola Peninsula

51-4434

Passive microwave retrievals of precipitation over the southern ocean.

Lachlan-Cope, T.A., Turner, J., *International journal of remote sensing,* May 20, 1997, 18(8), p.1725-1742, 12 refs.

Precipitation (meteorology), Polar atmospheres, Marine atmospheres, Spaceborne photography, Radiometry, Ice detection, Falling snow, Cloud cover, Water content, Brightness, Ice crystal optics

Many algorithms developed to retrieve precipitation and cloud liquid water from passive microwave measurement at mid-latitudes do not necessarily work well over the ice-free oceans that surround the antarctic continent where most precipitation falls in the form of snow. It is known that the clouds that produce most of the precipitation over the southern latitudes are thin stratiform clouds and the precipitation they give is of slight intensity. In this paper the polarization corrected temperature method for detecting precipitation is applied and compared with a new physical method that simultaneously retrieves both cloud liquid water and precipitation amount. Both methods are compared with the few *in situ* measurements available. The new iterative physical method is found to give better results and does not need any empirically derived parameters. (Auth. mod.)

51-4435

Snow depth inverted by scattering indices of SSM/I channels in a mesh graph.

Jin, Y.Q., *International journal of remote sensing,* May 20, 1997, 18(8), p.1843-1849, 7 refs.

Snow surveys, Remote sensing, Snow depth, Snow cover distribution, Snow water equivalent, Radiometry, Scattering, Sensor mapping, Forest canopy, Vegetation patterns, Mathematical models

51-4436

New gridded currents for the International Ice Patrol operations area.

Murphy, D.L., Viekman, B., Channel, C., Oceans 96 MTS/IEEE Conference, Fort Lauderdale, FL, Sep. 23-26, 1996. Proceedings, Vol.2. Prospects for the 21st century, Piscataway, Institute of Electrical and Electronics Engineers, Inc., 1996, p.613-618, 9 refs.

DLC GC2.O37

Oceanography, Ocean currents, Drift stations, Ice reporting, Sea ice distribution, Icebergs, Drift, Data processing, Sensor mapping

51-4437

Drilling oil-islands in the Beaufort Sea.

Batchelder, G.W., Oceans 96 MTS/IEEE Conference, Fort Lauderdale, FL, Sep. 23-26, 1996. Proceedings, Vol.2. Prospects for the 21st century, Piscataway, Institute of Electrical and Electronics Engineers, Inc., 1996, p.760-762.

DLC GC2.O37

Hydrocarbons, Natural resources, Oceanography, Offshore drilling, Ice islands, Construction, Dredging, Beaufort Sea

51-4438

Experimental study of ice-cylindrical pile interaction.

Bekker, A.T., Seliverstov, V.I., Oceans 96 MTS/IEEE Conference, Fort Lauderdale, FL, Sep. 23-26, 1996. Proceedings, Vol.2. Prospects for the 21st century, Piscataway, Institute of Electrical and Electronics Engineers, Inc., 1996, p.892-893, 9 refs.

DLC GC2.O37

Offshore structures, Pile structures, Sea ice, Impact tests, Floating ice, Ice mechanics, Ice solid interface, Ice deformation, Mechanical tests, Simulation

51-4439

Reliability evaluation of ice-resistant offshore structures.

Bekker, A.T., Komarova, O.A., Oceans 96 MTS/IEEE Conference, Fort Lauderdale, FL, Sep. 23-26, 1996. Proceedings, Vol.2. Prospects for the 21st century, Piscataway, Institute of Electrical and Electronics Engineers, Inc., 1996, p.894-896, 9 refs.

DLC GC2.O37

Offshore drilling, Offshore structures, Bearing strength, Sea ice, Ice floes, Impact strength, Ice loads, Ice solid interface, Design criteria, Ice mechanics, Statistical analysis

51-4440

Sea ice characterization with a correlation sonar.

Galloway, J.L., Oceans 96 MTS/IEEE Conference, Fort Lauderdale, FL, Sep. 23-26, 1996. Proceedings, Vol.3. Prospects for the 21st century, Piscataway, Institute of Electrical and Electronics Engineers, Inc., 1996, p.1381-1387, 8 refs.

DLC QC2.O37

Sea ice, Ice surveys, Acoustic measurement, Sensors, Ice acoustics, Drift, Velocity measurement, Ocean currents, Sound waves, Backscattering, Ice bottom surface, Design, Correlation

51-4441

Simulation study of soil erosion by snowmelt and spring rainfall.

Geng, G.Q., Montreal, McGill University, 1994, 227p., University Microfilms order No.AADAA-INN00092, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, 1996, p.5395.

Precipitation (meteorology), Soil erosion, Water erosion, Snow hydrology, Snowmelt, Thaw depth, Frozen ground physics, Rain, Forecasting, Simulation, Models

51-4442

Snow distribution in alpine watersheds (Sierra Nevada, California).

Elder, K.J., Santa Barbara, University of California, 1995, 309p., University Microfilms order No.AADAA-I9605805, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B., 1996, p.5390.

Snow hydrology, Watersheds, Alpine landscapes, Snow surveys, Snow cover distribution, Snow water equivalent, Radiation balance, Solar radiation, Models, Statistical analysis

51-4443

Water movement and ripening processes in snowpacks of the Sierra Nevada.

Kattelmann, R.C., Santa Barbara, University of California, 1995, 94p., University Microfilms order No.AADAA-I9605815, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B., 1996, p.5391.

Snow hydrology, Watersheds, Runoff, Snow cover structure, Snowmelt, Meltwater, Saturation, Seepage, Water flow, Ice water interface, Wet snow

51-4444

Radiation transport in the atmosphere-sea ice-ocean system.

Jin, Z.G., Fairbanks, University of Alaska Fairbanks, 1995, 135p., University Microfilms order No.AADAA-I9605717, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B., 1996, p.5555.

Climatology, Cloud cover, Stratification, Radiation balance, Solar radiation, Atmospheric boundary layer, Marine atmospheres, Sea ice, Air ice water interaction, Snow ice interface, Mathematical models, Ice cover effect, Snow cover effect

51-4445

Relationships between spatial pattern and environment at the alpine treeline ecotone, Glacier National Park, Montana.

Allen, T.R., Chapel Hill, University of North Carolina at Chapel Hill, 1995, 276p., University Microfilms order No.AADAA-I965087, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B., 1996, p.5395.

Ecosystems, Alpine landscapes, Landscape types, Forest lines, Geophysical surveys, LANDSAT, Vegetation patterns, Classifications, Photointerpretation, Statistical analysis

51-4446

Scale effects in determining snowmelt from mountainous basins using a distributed approach for snow water equivalence and radiation, and a point snowmelt model (Sierra Nevada, California).

Galarraga Sanchez, R.H., Tucson, University of Arizona, 1995, 240p., University Microfilms order No.AADAA-I9603362, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B., 1996, p.5391.

Watersheds, River basins, Snow hydrology, Snowmelt, Runoff forecasting, Snow water equivalent, Topographic effects, Models, Classifications, Statistical analysis

51-4447

Diffusion studies on copper ruthenium(001) and single-crystal ice on ruthenium(001).

Brown, D.E., Stanford, Stanford University, 1995, 180p., University Microfilms order No.AADAA-I9602843, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec B, 1996, p.5503.

Ice physics, Ice solid interface, Metals, Molecular energy levels, Substrates, Ion diffusion, Ice spectroscopy, Lasers, Thermal analysis

51-4448

Methane and nitrogen ices on Pluto and Triton: a combined laboratory and telescope investigation.

Grundy, W.M., Tucson, University of Arizona, 1995, 185p., University Microfilms order No.AADAA-I9603675, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, 1996, p.5548.

Extraterrestrial ice, Satellites (natural), Regolith, Ground ice, Distribution, Remote sensing, Ice spectroscopy, Spectra, Radiation absorption, Simulation, Correlation

51-4449

Observational study of mixing in the arctic winter stratosphere.

Dahlberg, S.P., College Station, Texas A&M University, 1995, 46p., University Microfilms order No.AADAA-I9539189, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, 1996, p.5554.

Climatology, Wind (meteorology), Polar atmospheres, Stratosphere, Turbulent boundary layer, Atmospheric circulation, Wind direction, Atmospheric pressure, Seasonal variations, Air entrainment

51-4450

Charcoal in northcentral Alaskan lake sediments: relationships to fire and late-Quaternary vegetation history.

Earle, C.J., Brubaker, L.B., Anderson, P.M., *Review of palaeobotany and palynology,* Apr. 1996, 92(1-2), p.83-95, 32 refs.

Limnology, Palynology, Paleobotany, Paleoecology, Vegetation patterns, Lacustrine deposits, Hydrocarbons, Forest fires, Quaternary deposits, Sampling, Particle size distribution, Environmental impact, Statistical analysis, Correlation, United States—Alaska

51-4451

Glaciation-induced variations in the Earth's precession frequency, obliquity and insolation over the last 2.6 Ma.

Mitrovica, J.X., Forte, A.M., Pan, R., *Geophysical journal international,* Feb. 1997, 128(2), p.270-284, 37 refs.

Pleistocene, Geologic processes, Rheology, Ice sheets, Glaciation, Glacier oscillation, Ice loads, Insolation, Viscoelasticity, Ice cover effect, Isostasy, Sea level

51-4452

Material versus isobaric internal boundaries in the Earth and their influence on postglacial rebound.

Johnston, P., Lambeck, K., Wolf, D., *Geophysical journal international,* May 1997, 129(2), p.252-268, 62 refs.

Pleistocene, Ice loads, Glacier melting, Isostasy, Viscoelasticity, Rheology, Geologic processes, Deformation, Phase transformations, Relaxation (mechanics), Theories, Viscoelasticity, Mathematical models

51-4453

Frequency distributions and transformations of lake variables catchment area and morphometric parameters in predictive regression models for small glacial lakes.

Håkanson, L., Lindström, M., *Ecological modelling,* June 30, 1997, 99(2-3), p.171-201, 49 refs.

Watersheds, Limnology, Glacial lakes, Physical properties, Distribution, Sampling, Statistical analysis, Correlation, Accuracy, Models, Forecasting

51-4454

Study of crystalline water at low temperatures by selective laser excitation of fluorescence of the impurity uranil ion.

Al'shits, E.I., Krasheninnikov, V.N., Kulikov, S.G., Kharlamov, B.M., *Optics and spectroscopy,* Dec. 1996, 81(6), p.875-879, Translated from Optika i spektroskopiia. 26 refs.

Ice spectroscopy, Ice physics, Impurities, Ions, Solutions, Lasers, Probes, Luminescence, Ice microstructure, Molecular energy levels

51-4455

Comparison of sea-ice thickness measurements under summer and winter conditions in the Arctic using a small electromagnetic induction device.

Haas, C., Gerland, S., Eicken, H., Miller, H., *Geophysics,* May-June 1997, 62(3), p.749-757, 29 refs.

Oceanography, Ice surveys, Sea ice distribution, Ice cover thickness, Seasonal variations, Sounding, Electrical measurement, Remote sensing, Ice dielectrics, Electrical resistivity, Electromagnetic properties, Polarization (charge separation), Models, Arctic Ocean

51-4456

Magnetic and gravity anomaly patterns related to hydrocarbon fields in northern West Siberia.

Piskarev, A.L., Chernyshev, M.IU., *Geophysics,* May-June 1997, 62(3), p.831-841, 13 refs.

Geophysical surveys, Arctic landscapes, Hydrocarbons, Reservoirs, Geomagnetism, Electromagnetic prospecting, Geochemistry, Gravity anomalies, Magnetic anomalies, Spectra, Earth crust, Russia—Siberia

51-4457

Thermophysical properties of epoxy compounds at low temperatures.

Tanaeva, S.A., Evseeva, L.E., *Journal of engineering physics and thermophysics,* Aug. 1997, 70(1), p.13-17, Translated from Inzhenerno-fizicheskiĭ zhurnal. 10 refs.

Polymers, Composite materials, Mechanical properties, Low temperature tests, Cryogenics, Thermal conductivity, Thermal expansion, Heat capacity, Thermal diffusion

51-4458

Experimental study on unfrozen water migration in porous materials during freezing.

Ishizaki, T., *Journal of natural disaster science,* 1995, 17(2), p.65-74, 11 refs.

Buildings, Construction materials, Rock mechanics, Weathering, Porous materials, Frost heave, Freeze thaw cycles, Ice lenses, Ice growth, Ice temperature, Water flow, Unfrozen water content, Mechanical tests, Temperature gradients

51-4459

Cryogenic drilling: a new drilling method for environmental remediation.

Simon, R.D., Cooper, G.A., *Ground water monitoring & remediation,* 1996, 16(3), p.79-85, 13 refs.

Borehole instruments, Rotary drilling, Soil pollution, Cryogenics, Soil stabilization, Soil freezing, Sampling, Environmental tests, Design

51-4460

Sample-freezing drive shoe for a wire line piston core sampler.

Murphy, F., Herkelrath, W.N., *Ground water monitoring & remediation,* 1996, 16(3), p.86-90, 9 refs.

Soil science, Soil pollution, Core samplers, Rotary drilling, Design, Sediments, Soil freezing, Soil stabilization, Cryogenics, Carbon dioxide, Noncohesive soils, Sands

51-4461
Measuring salt and freezing temperature on roads.
Turunen, M., *Meteorological applications,* Mar. 1997, 4(1), p.11-15, 2 refs.
Road icing, Ice removal, Salting, Solutions, Salinity, Ion density (concentration), Surface temperature, Electrical measurement, Electrical resistivity, Sensors, Air temperature, Freezing points, Temperature variations, Accuracy

51-4462
Predicting road hazards caused by rain, freezing rain and wet surfaces and the role of weather radar.
Symons, L., Perry, A., *Meteorological applications,* Mar. 1997, 4(1), p.17-21, 6 refs.
Road icing, Precipitation (meteorology), Ice storms, Surface temperature, Ice detection, Ice forecasting, Weather forecasting, Safety, Radar echoes, Imaging

51-4463
Supercell storms in Switzerland: case studies and implications for nowcasting severe winds with Doppler radar.
Schmid, W., Schiesser, H.H., Bauer-Messmer, B., *Meteorological applications,* Mar. 1997, 4(1), p.49-67, 39 refs.
Hail, Ice storms, Synoptic meteorology, Fronts (meteorology), Wind (meteorology), Turbulent boundary layer, Wind factors, Damage, Weather forecasting, Radar echoes, Ice detection, Switzerland

51-4464
Climate during glaciation and deglaciation identified through chemical tracers in ice-cores.
Marsh, N.D., Ditlevsen, P.D., *Geophysical research letters,* June 1, 1997, 24(11), p.1319-1322, 25 refs.
Paleoclimatology, Climatic changes, Ice sheets, Glacier oscillation, Ice cores, Ice composition, Isotope analysis, Sea level, Air temperature, Correlation, Sampling, Aerosols, Statistical analysis

51-4465
Sensitivity of simulated salinity in a three-dimensional ocean model to upper ocean transport of salt from sea-ice formation.
Duffy, P.B., Caldeira, K., *Geophysical research letters,* June 1, 1997, 24(11), p.1323-1326, 30 refs.
Oceanography, Sea ice, Ice water interface, Ice formation, Ice melting, Salinity, Brines, Ocean currents, Turbulent diffusion, Water chemistry, Simulation, Models
The authors show that explicit representation of sinking of salt rejected during sea-ice formation dramatically improves simulated salinity in an ocean general circulation model (OGCM). In a "control" simulation, rejected salt goes into the top model layer, and simulated salinities are typical of OGCMs: the deep ocean is too fresh, and the intermediate-depth salinity minimum associated with Antarctic Intermediate Water is absent. These problems are eliminated in the "test" simulation, in which rejected salt is uniformly distributed over the upper 160 m. Also, the strength of the Antarctic Circumpolar Current is more realistic in this simulation. These results show the need for, but do not provide, a better representation of sinking of rejected salt. The sensitivity of this model to sinking of rejected salt suggests that a similar sensitivity may exist in the real ocean, and that loss of antarctic sea ice might have major effects. (Auth. mod.)

51-4466
Viscoelastic properties of polycrystalline solid methane and carbon dioxide.
Yamashita, Y., Kato, M., *Geophysical research letters,* June 1, 1997, 24(11), p.1327-1330, 14 refs.
Cryogenics, Fluid dynamics, Natural gas, Carbon dioxide, Solidification, Phase transformations, Viscoelasticity, Mechanical tests, Deformation, Temperature effects, Low temperature research

51-4467
UV and optical light transmission properties in deep ice at the South Pole.
Askebjer, P., et al, *Geophysical research letters,* June 1, 1997, 24(11), p.1355-1358, 9 refs.
Glaciology, Ice sheets, Ice cores, Ice optics, Sampling, Light transmission, Light scattering, Radiation absorption, Gamma irradiation, Impurities, Bubbles, Antarctica—Amundsen-Scott Station
Both absorption and scattering of light at wavelengths 410 to 610 nm were measured in the South Pole ice at depths 0.8 to 1 km with the laser calibration system of the Antarctic Muon And Neutrino Detector Array (AMANDA). At the shortest wavelengths the absorption lengths exceeded 200 m—an order of magnitude longer than has been reported for laboratory ice. The absorption shows a strong wavelength dependence while the scattering length is found to be independent of the wavelength, consistent with the hypothesis of a residual density of air bubbles in the ice. The observed linear decrease of the inverse scattering length with depth is compatible with an earlier measurement by the AMANDA collaboration (at ca. 515 nm). (Auth.)

51-4468
Measurement of gravity wave activity within and around the arctic stratospheric vortex.
Whiteway, J.A., Duck, T.J., Donovan, D.P., Bird, J.C., Pal, S.R., Carswell, A.I., *Geophysical research letters,* June 1, 1997, 24(11), p.1387-1390, 15 refs.
Climatology, Polar atmospheres, Stratosphere, Atmospheric circulation, Gravity waves, Wave propagation, Lidar, Air temperature, Temperature variations, Spectra, Wind direction, Profiles

51-4469
Uptake of HNO_3 on ice under upper tropospheric conditions.
Zondlo, M.A., Barone, S.B., Tolbert, M.A., *Geophysical research letters,* June 1, 1997, 24(11), p.1391-1394, 18 refs.
Climatology, Cloud physics, Aerosols, Ozone, Heterogeneous nucleation, Ice vapor interface, Vapor diffusion, Ice spectroscopy, Mass transfer, Supercooled clouds, Monomolecular films, Simulation

51-4470
Integrated IR band intensities of the v_5 and v_1 bands of ClOOCl.
Brust, A.S., Zabel, F., Becker, K.H., *Geophysical research letters,* June 1, 1997, 24(11), p.1395-1398, 19 refs.
Climatology, Polar stratospheric clouds, Cloud physics, Aerosols, Photochemical reactions, Ozone, Degradation, Radiation absorption, Simulation, Spectroscopy, Spectra
The aim of the present work is to determine the integrated band intensities and absorption coefficients of the two strongest IR absorption bands of ClOOCl in the region 550-4000/cm, i.e. the v_5 and v_1 bands close to 650 and 750/cm, in order to explore the potential of IR absorption as a detection method for ClOOCl in the antarctic stratosphere. (Auth. mod.)

51-4471
Marine molluscs as indicators of environmental change in glaciated North America and Greenland during the last 18 000 years.
Dyke, A.S., Dale, J.E., McNeely, R.N., *Géographie physique et Quaternaire,* 1996, 50(2), p.125-184, With French and German summaries. Refs. p.177-184.
Pleistocene, Paleoclimatology, Marine deposits, Paleoecology, Distribution, Glaciation, Ocean currents, Quaternary deposits, Sampling, Classifications, Radioactive age determination, Statistical analysis, Greenland, North America

51-4472
Delayed deglaciation by downwasting of the Northeast Avalon Peninsula, Newfoundland: an application of the early postglacial pollen record.
Macpherson, J.B., *Géographie physique et Quaternaire,* 1996, 50(2), p.201-220, With French and German summaries. Refs. p.218-220.
Glacial geology, Marine deposits, Lacustrine deposits, Quaternary deposits, Palynology, Vegetation patterns, Geomorphology, Drill core analysis, Lithology, Glacier oscillation, Meltwater, Radioactive age determination, Correlation, Geochronology, Canada—Newfoundland

51-4473
Geomorphological observations on the boulder-strewn tidal flat, at Petite-Rivière, Charlevoix, Québec. [Observations géomorphologiques sur la batture à méga-blocs, à Petite-Rivière, Charlevoix, Québec]
Dionne, J.C., Poitras, S., *Géographie physique et Quaternaire,* 1996, 50(2), p.221-232, In French with English and German summaries. 23 refs.
Littoral zone, Rivers, Geomorphology, Shore erosion, Glacial deposits, Quaternary deposits, Sediment transport, Fast ice, Canada—Quebec—Charlevoix

51-4474
Taphonomic view of the wood charcoal stratigraphy and dating in soil: a case study of some soils from the French Alps. [Aspects taphonomiques de la stratigraphie et de la datation de charbons de bois dans les sols: exemple de quelques sols des Alpes]
Carcaillet, C., Talon, B., *Géographie physique et Quaternaire,* 1996, 50(2), p.233-244, In French with English and Italian summaries. 33 refs.
Quaternary deposits, Alpine landscapes, Mountain soils, Soil dating, Soil profiles, Hydrocarbons, Carbon isotopes, Radioactive age determination, Forest fires, Stratigraphy, Stratification, Cryoturbation, France—Alps

51-4475
Photolysis and radiolysis of water ice on outer solar system bodies.
Johnson, R.E., Quickenden, T.I., *Journal of geophysical research,* May 25, 1997, 102(E5), p.10,985-10,996, Refs. p.10,994-10,996.
Extraterrestrial ice, Remote sensing, Simulation, Satellites (natural), Regolith, Ice sublimation, Ionization, Radiation absorption, Photochemical reactions, Luminescence, Reflectivity, Ice spectroscopy, Spectra

51-4476
Nuclear wastes in the Arctic—an analysis of arctic and other regional impacts from Soviet nuclear contamination.
U.S. Congress. Office of Technology Assessment, U.S. Congress. Office of Technology Assessment. Report OTA-ENV-623, Washington, D.C., U.S. Government Printing Office, Sep. 1995, 239p., Var. refs. DLC TD196.R3 N84
Nuclear power, Oceanography, Radioactive wastes, Migration, Waste disposal, Water pollution, Monitors, Environmental protection, Environmental impact, Safety, Research projects, Arctic Ocean

51-4477
Cryogenic air sampling system for measurements of the concentrations of stratospheric trace gases and their isotopic ratios over Antarctica.
Honda, H., Aoki, S., Nakazawa, T., Morimoto, S., Yajima, N., *Journal of geomagnetism and geoelectricity,* 1996, 48(9), p.1145-1155, 21 refs.
Atmospheric composition, Isotope analysis, Gases, Carbon dioxide, Stratosphere, Antarctica—Showa Station
In order to measure the concentrations of trace gases such as CO_2, CH_4, N_2O and halocarbons and the isotopic ratios of $\delta^{13}C$, $\delta^{18}O$ and $\Delta^{14}C$ of CO_2 in the stratosphere over Antarctica in Jan. 1998, a balloon-borne cryogenic air sampling system was developed on the basis of the sampler which has been used for the collection of stratospheric air over Japan since 1985. The sampler developed in this study is capable of collecting air samples with volumes of 20-30 l_{STP} at 12 height levels. Special attention was paid to the sampler so that the collection of a large amount of the stratospheric air can be completed in a short time, which is crucial for recovering the sampler near the station using a helicopter. In addition, the sampler was designed to land on the sea or the ice field safely. Flight trajectories of the sampler were also simulated using the wind data observed at Showa Station. The results suggested that the sampler may land within approximately 150 km from the station, if air sampling is made in the summer season. Indeed, the trajectories were validated by experiments made using a rubber balloon at Showa Station on Jan. 21 and Feb. 6, 1995. (Auth. mod.)

51-4478
Polar vortex meandering and stratospheric aerosol distribution: lidar measurements at Fairbanks, Alaska.
Iwasaka, Y., et al, *Journal of geomagnetism and geoelectricity,* 1996, 48(9), p.1157-1167, 13 refs.
Measuring instruments, Aerosols, Stratosphere, Atmospheric composition, Polar regions, Polar atmospheres, Atmospheric circulation, Meteorological instruments, Lidar, United States—Alaska—Fairbanks

51-4479
Arctic tropospheric aerosols and clouds in the polar night season observed by a lidar at Eureka, Canada.
Shibata, T., Itabe, T., Mizutani, K., Uchino, O., Nagai, T., Fujimoto, T., *Journal of geomagnetism and geoelectricity,* 1996, 48(9), p.1169-1177, 6 refs.
Aerosols, Clouds (meteorology), Lidar, Winter, Troposphere, Canada—Northwest Territories—Eureka

51-4480
Major ionic and trace metal constituents in snow at Ester Dome, Fairbanks, Alaska.
Osada, K., Matsunaga, K., Shibata, T., Adachi, H., Iwasaka, Y., *Journal of geomagnetism and geoelectricity,* 1996, 48(9), p.1179-1188, 30 refs.
Snow composition, Ions, Metals, Snow impurities, Air pollution, Scavenging, United States—Alaska—Fairbanks, United States—Alaska—Ester Dome

51-4481
On the integrated investigations of the astrophysical atmosphere and geophysical phenomena.
Gladysheva, O.G., Kocharov, G.E., *Journal of geomagnetism and geoelectricity,* 1996, 48(9), p.1197-1199, 7 refs.
Research projects, Atmospheric composition, Atmospheric electricity, Radioactive isotopes, Ice cores
The purpose of this paper is to stress the importance of collaborative research using natural archives of the cosmogenic nuclei and of the nitrates generated in the Earth's atmosphere. Measurements of the nitrate abundance in ice cores in polar regions open a new possibility of receiving information on the solar activity for hundreds and thousands of years in the past. In the paper of Dreschhoff and Zeller (1994), a correlation is found between the precipitation of the nitrates and the flux of solar flare protons. For example, a clear increase of the nitrate abundance was detected during the solar flare in Aug. 1972, in the ice cores of both Greenland and Antarctica. (Auth. mod.)

51-4482
Mid- to Late Pleistocene ice drift in the western Arctic Ocean: evidence for a different circulation in the past.
Bischof, J.F., Darby, D.A., *Science,* July 4, 1997, 277(5322), p.74-78, 38 refs.
Sea ice, Ocean currents, Drift, Icebergs, Ice rafting, Arctic Ocean

51-4483
Glacial cycles and astronomical forcing.
Muller, R.A., MacDonald, G.J., *Science,* July 11, 1997, 277(5323), p.215-218, 36 refs.
Glaciation, Periodic variations, Pleistocene, Ice age theory, Paleoclimatology

51-4484
Tectonic structures and glaciomarine sedimentation in the southeastern Weddell Sea from seismic reflection data. [Tektonischer Aufbau und glaziomarine Sedimentation im südöstlichen Weddellmeer nach reflexionsseismischen Untersuchungen]
Oszkó, L., *Berichte zur Polarforschung,* 1997, No.222, 153p., With German summary. Refs. p.143-153.
Sediments, Geologic structures, Marine geology, Tectonics, Seismic surveys, Models, Marine deposits, Bottom sediment, Glacial deposits, Antarctica—Weddell Sea
This thesis addresses the glaciomarine sedimentation and early tectonic history of the southeastern Weddell Sea and proposes a model from the analysis of more than 25,000 km multichannel seismic data. The proposed seismic stratigraphic model includes the results of piston coring, drilling and bathymetric surveys. The tectonic interpretation was further supported by the compilation of published marine and satellite gravity surveys and magnetic anomaly maps. (Auth. mod.)

51-4485
Sea ice thickness measurements using seismic and electromagnetic-inductive techniques. [Bestimmung der Meereisdicke mit seismischen und elektromagnetisch-induktiven Verfahren]
Haas, C., *Berichte zur Polarforschung,* 1997, No.223, 161p., In German with English summary. Refs. p.151-158.
Sea ice, Ice cover thickness, Seismic surveys, Electromagnetic prospecting, Antarctica—Bellingshausen Sea, Antarctica—Amundsen Sea
In this thesis, two geophysical methods, a seismic and an electromagnetic-inductive technique are examined for their accuracy and general applicability. Both aspects are investigated by means of comparisons of drill-hole determined with geophysically derived thicknesses along extended profiles. Additionally, the thickness range, resolution and sensitivity against variable ice properties are examined by means of theoretical model calculations. The porosity of the ice and its electrical conductivity are derived by means of ice core analyses. These are the main variables influencing the propagation of elastic waves and the development of electromagnetic fields in the ice. The bulk of the data in this report is gleaned from northern hemispheric ice sources. A near-closing section, p.127-145, presents measurements from the Bellingshausen and Amundsen Seas. (Auth. mod.)

51-4486
Gravity field in the Weddell Sea, Antarctica, by radar altimetry from GEOSAT and ERS-1. [Ein Beitrag zum Schwerefeld im Bereich des Weddellmeeres, Antarktis, Nutzung von Altimitermessungen des GEOSAT und ERS-1]
Schöne, T., *Berichte zur Polarforschung,* 1997, No.220, 145p., In German with English summary. Refs. p.127-136.
Height finding, Measuring instruments, Gravity, Mapping, Sea ice, Analysis (mathematics), Antarctica—Weddell Sea
Radar altimeter measurements carried out by the satellites GEOSAT and ERS-1 were analyzed. This work focuses mainly on the computation of gravity anomalies in ice covered regions, especially in the Weddell Sea. Due to the permanent sea ice coverage in the southern oceans, only a reduced number of sub-satellite tracks could be used for these investigations. New algorithms and strategies were developed. At first the radar altimeter measurements were corrected for various effects, e.g. ionospheric and tropospheric delays or tides. Then, a collinear analysis and a crossover adjustment were combined with robust outlier detection algorithms. Finally, averaged height profiles were extracted from repeat orbits and used for the computation of gravity anomalies and the mean sea surface. By combining the measurements from ERS-1 and GEOSAT a significant improvement of the resolution of the models was achieved. The altimeter data were also used for the determination of an improved sea surface height model. (Auth. mod.)

51-4487
Theory and numerical application of subsurface flow and transport for transient freezing conditions.
White, M.D., "Hydrology Days" Conference, 15th, Ft. Collins, CO, Apr. 3-7, 1995. Paper and Pacific Northwest Laboratory. Report PNL-SA-25595, Richland, 1995, 14p., DE95 014182, 22 refs.
Frozen ground mechanics, Soil freezing, Subsurface drainage, Radioactivity, Phase transformations, Saturation, Unfrozen water content, Capillarity, Ice water interface, Soil water migration, Linings, Permeability, Environmental protection, Mathematical models

51-4488
Investigating the emission of neutrons during the fracturing of D_2O ice and during the fracturing of Ti shavings immersed in D_2O.
Kurtz, S.K., Catchen, G.L., Kenney, E.S., Mecholsky, J.J., Pennsylvania State University. Final report, University Park, Jan. 1991, 27p., ADA-299 159, 6 refs.
Ice physics, Deuterium oxide ice, Ice solid interface, Mechanical tests, Cracking (fracturing), Projectile penetration, Neutron scattering, Statistical analysis

51-4489
Evaluation of water in silica pores using differential scanning calorimetry.
Ishikiriyama, K., Todoki, M., *Thermochimica acta,* June 1, 1996, 256(2), p.212-226, 26 refs.
Ice physics, Ice melting, Colloids, Porosity, Thermodynamics, Temperature measurement, Freezing points, Melting points, Particles, Layers, Density (mass/volume), Unfrozen water content, Ice solid interface, Saturation

51-4490
Appraisal of the radiation hazard of radioactive waste discharges in the Kara and Barents Sea.
Sivintsev, IU.V., NATO Advanced Research Workshop on Nuclear and Chemical Contamination in the Countries of the former Soviet Union: Cleanup, Management and Prevention, Atlanta, GA, Feb. 16-22, 1995. Proceedings. Assessing the risks of nuclear and chemical contamination in the former Soviet Union. Edited by E.J. Kirk and NATO Advanced Science Institutes, Series 2. Environment. Vol.10, Dordrecht, Kluwer Academic Publishers, 1996, p.85-100, 7 refs.
DLC TD196.R3 O88
Oceanography, Water pollution, Radioactive wastes, Waste disposal, Radioactivity, Environmental impact, Environmental protection, Safety, Monitors, Protection, Russia—Kara Sea, Barents Sea

51-4492
Unusual playa sliders at Double Lakes, Texas.
Reeves, C.C., Jr., *Geology today,* Nov.-Dec. 1996, 12(6), p.207-209.
Lakes, Bottom sediment, Sediment transport, Ice floes, Ice rafting, Drift, Sliding, Soil erosion, United States—Texas

51-4493
Cold season CO_2 emission from arctic soils.
Oechel, W.C., Vourlitis, G., Hastings, S.J., *Global biogeochemical cycles,* June 1997, 11(2), p.163-172, 26 refs.
Tundra soils, Soil tests, Subarctic landscapes, Tundra terrain, Ecosystems, Soil air interface, Carbon dioxide, Vapor transfer, Soil profiles, Soil temperature, Seasonal variations, Geochemical cycles, Frozen ground chemistry

51-4494
Extension across a divergent plate boundary, the Eastern Volcanic Rift Zone, south Iceland, 1967-1994, observed with GPS and electronic distance measurements.
Jónsson, S., Einarsson, P., Sigmundsson, F., *Journal of geophysical research,* June 10, 1997, 102(B6), p.11,913-11,929, 48 refs.
Tectonics, Subpolar regions, Geodetic surveys, Volcanoes, Geologic processes, Earth crust, Deformation, Subsidence, Fracture zones, Profiles, Iceland

51-4495
Self-organization in the thermomechanical flow of ice sheets.
Payne, A.J., Dongelmans, P.W., *Journal of geophysical research,* June 10, 1997, 102(B6), p.12,219-12,233, 41 refs.
Glaciology, Ice sheets, Glacier flow, Oscillations, Ice creep, Glacial hydrology, Thermal regime, Ice mechanics, Ice air interface, Ice temperature, Thermodynamics, Ice models, Mathematical models

51-4496
Measurements of melting layer attenuation at X-band frequencies.
Bellon, A., Zawadzki, I., Fabry, F., *Radio science,* May-June 1997, 32(3), p.943-955, 20 refs.
Precipitation (meteorology), Radar echoes, Attenuation, Snowflakes, Snow melting, Reflectivity, Profiles, Brightness, Correlation, Ice crystal optics, Statistical analysis

51-4497
Laboratory studies of ternary $H_2SO_4/HNO_3/H_2O$ particles: implications for polar stratospheric cloud formation.
Anthony, S.E., Onasch, T.B., Tisdale, R.T., Disselkamp, R.S., Tolbert, M.A., *Journal of geophysical research,* May 20, 1997, 102(D9), p.10,777-10,784, 27 refs.
Climatology, Polar stratospheric clouds, Cloud physics, Freezing points, Aerosols, Solubility, Particles, Heterogeneous nucleation, Supercooled clouds, Simulation, Infrared spectroscopy
It has recently been suggested that type Ib polar stratospheric clouds are composed of supercooled ternary-solutions of sulfuric acid (H_2SO_4), nitric acid (HNO_3), and water (H_2O). The authors have studied the low-temperature behavior of ternary-solution aerosols to determine if they will undergo homogeneous freezing nucleation under polar stratospheric conditions. Ternary-solution aerosols were injected into a low-temperature chamber and observed for periods of up to 3 hours. Fourier transform infrared spectroscopy was used to determine the aerosol composition and phase as a function of time. Ternary-solution aerosols with compositions similar to those expected in the polar stratosphere remained supercooled for the duration of the experiments. Homogeneous freezing of the particles was never observed, even after warming from 190 to 204 K. However, heterogeneous freezing was occasionally observed for particles adhering to the infrared optics within the chamber. (Auth. mod.)

51-4498
Observations of ozone structures in the arctic polar vortex.
Bird, J.C., et al, *Journal of geophysical research,* May 20, 1997, 102(D9), p.10,785-10,800, 41 refs.
Climatology, Polar atmospheres, Atmospheric composition, Ozone, Stratosphere, Advection, Air flow, Wind direction, Lidar, Radio echo soundings, Stratification, Statistical analysis, Canada—Northwest Territories—Eureka

51-4499

Aircraft-borne detection of stratospheric column amounts of O_3, NO_2, OClO, $ClNO_3$, and aerosols around the arctic vortex (79°N to 39°N) during spring 1993. 1. Observational data.

Pfeilsticker, K., et al, *Journal of geophysical research,* May 20, 1997, 102(D9), p.10,801-10,814, Refs. p.10,813-10,814.

Climatology, Polar atmospheres, Stratosphere, Atmospheric composition, Aerosols, Ozone, Aerial surveys, Lidar, Sounding, Profiles, Backscattering, Degradation, Subsidence

51-4500

Ozone depletion in the late winter lower arctic stratosphere: observations and model results.

Bregman, A., et al, *Journal of geophysical research,* May 20, 1997, 102(D9), p.10,815-10,828, Refs. p.826-828.

Climatology, Polar atmospheres, Atmospheric composition, Degradation, Ozone, Air masses, Aerosols, Sounding, Atmospheric circulation, Mathematical models, Correlation

51-4501

Polar stratospheric clouds observed by lidar over Spitsbergen in the winter of 1994/95: liquid particles and vertical "sandwich" structure.

Shibata, T., et al, *Journal of geophysical research,* May 20, 1997, 102(D9), p.10,829-10,840, Refs. p.10,839-10,840.

Climatology, Polar atmospheres, Polar stratospheric clouds, Cloud physics, Aerosols, Heterogeneous nucleation, Lidar, Stratification, Backscattering, Polarization (waves), Profiles, Refractivity, Norway—Spitsbergen

51-4502

Energy and water transport in climates simulated by a general circulation model that includes dynamic sea ice.

Watterson, I.G., O'Farrell, S.P., Dix, M.R., *Journal of geophysical research,* May 27, 1997, 102(D10), p.11,027-11,037, 32 refs.

Climatology, Greenhouse effect, Carbon dioxide, Ocean currents, Heat flux, Air ice water interaction, Sea ice distribution, Ice openings, Ice water interface, Surface energy, Models, Simulation

The authors analyze energy and water transport in present, doubled CO_2, and tripled CO_2 climates simulated by the Mark 2 CSIRO nine-level general circulation model with a mixed layer ocean to include the antarctic region. The model includes a dynamic sea ice, and a prescribed ocean heat transport, and describes a 30-year climatology of the 1 x CO_2 simulation, emphasizing the sea ice and the mean meridional energy and water transport. The ice depths, concentrations, and velocities are moderately realistic in both hemispheres. The model atmosphere transports less heat poleward in the doubled CO_2 climate, largely as a response to increased solar radiation absorbed at high latitudes. (Auth. mod.)

51-4503

Convective electrification of clouds: a numerical study.

Masuelli, S., Scavuzzo, C.M., Caranti, G.M., *Journal of geophysical research,* May 27, 1997, 102(D10), p.11,049-11,059, 39 refs.

Thunderstorms, Cloud physics, Cloud electrification, Charge transfer, Ice crystals, Hailstones, Aerosols, Ion diffusion, Ice vapor interface, Convection, Mathematical models

51-4504

Atmospheric net transport of water vapor and latent heat across 60°S.

Giovinetto, M.B., Yamazaki, K., Wendler, G., Bromwich, D.H., *Journal of geophysical research,* May 27, 1997, 102(D10), p.11,171-11,179, 48 refs.

Climatology, Marine atmospheres, Water vapor, Moisture transfer, Air ice water interaction, Sea ice distribution, Ice cover effect, Latent heat, Heat flux, Mathematical models

The mean annual moisture flux across 60°S is estimated using results of numerical analyses for the 7-year period 1985-1991. The atmospheric data indicate a net poleward transport of 17.06 kg/m/s or 10.74 Tt/yr. The mean annual moisture transport divergence for the area poleward of 60°S is estimated using a combination of surface and near-surface data (precipitation and evaporation for the southern ocean, net surface accumulation and seaward drifting snow transport for the antarctic ice sheet). The mass exchange rates at the ice sheet-atmosphere and ocean-atmosphere interfaces are integrated strictly for the area between 60°S and 70°S and are combined with the results of a preceding surface data estimate of transport divergence for the area poleward of 70°S. The estimates based on atmospheric and surface data show remarkable agreement (the difference is well within the error estimates. (Auth. mod.)

51-4505

Observation of atmospheric and climate dynamics from a high resolution ice core record of a passive tracer over the last glaciation.

Marsh, N.D., Ditlevsen, P.D., *Journal of geophysical research,* May 27, 1997, 102(D10), p.11,219-11,224, 22 refs.

Paleoclimatology, Climatic changes, Air temperature, Temperature variations, Ice sheets, Glacier oscillation, Ice cores, Ice composition, Aerosols, Isotope analysis, Oxygen isotopes, Ice dating, Spectra, Correlation

51-4506

Cirrus clouds: their role in climate and global change.

Lynch, D.K., *Acta astronautica,* June 1996, 38(11), p.859-863, 31 refs.

Climate, Ice crystals, Clouds (meteorology)

Cirrus clouds are high, cold clouds composed of asymmetric ice particles. Along with low marine stratus, they are the principal cloud type controlling the Earth's radiation budget. Thin cirrus clouds cause a net heating of the Earth because they allow visible sunlight to pass almost unhindered while at the same time absorbing and reradiating infrared radiation from the surface below. Cirrus clouds are also far more widespread than previously believed. Cirrus cloud climatologies have been examined based on ground observations, limb scanning, and down-looking satellite sensors. The global frequency of occurrence for cirrus clouds over land is between 28 and 42%. The zonal average frequency of occurrence for cirrus clouds varies from 7 to 61%. These values vary depending on geographic location and season, with some locations having persistent cirrus coverage while others have infrequent coverage. Although clearly evident trends are present in the geographical cirrus occurrence, month-to-month and year-to-year variations are so large that the statistics can only be used for the probabilistic assessments, not predictive purposes. In this paper the author surveys cirrus clouds and their radiative properties in terms of climate feedback, discusses multispectral cirrus cloud observations and reviews the latest satellite cloud climatologies. The area surveyed extended to approximately 70N and 70S with full global inclusions, longitudinally. (Auth. mod.)

51-4507

Winter road maintenance system.

Axelson, L.B., Maintenance Management Conference, 7th, Orlando, FL, July 18-21, 1994. Proceedings, Washington, D.C., National Academy Press, 1995, p.63-65.

DLC TE220.M338

Road maintenance, Winter maintenance, Snow removal, Salting, Logistics, Forecasting, Safety, Vehicles, Radio communication, Cold weather performance

51-4508

Japanese and European winter maintenance technology.

Smithson, L.D., Maintenance Management Conference, 7th, Orlando, FL, July 18-21, 1994. Proceedings, Washington, D.C., National Academy Press, 1995, p.66-68.

DLC TE220.M338

Road maintenance, Winter maintenance, Snow removal equipment, Ice control, Standards, Education, Cold weather performance

51-4509

Observations on overseas use of deicing chemicals.

Frevert, L.W., Maintenance Management Conference, 7th, Orlando, FL, July 18-21, 1994. Proceedings, Washington, D.C., National Academy Press, 1995, p.69-70.

DLC TE220.M338

Road maintenance, Winter maintenance, Chemical ice prevention, Ice control, Cold weather operation

51-4510

Application of prewetted snow and ice control materials.

Mergenmeier, A., Maintenance Management Conference, 7th, Orlando, FL, July 18-21, 1994. Proceedings, Washington, D.C., National Academy Press, 1995, p.71-73, 2 refs.

DLC TE220.M338

Road maintenance, Winter maintenance, Snow removal, Ice control, Salting, Mechanical properties, Moisture transfer, Hygroscopicity, Cold weather operation

51-4511

Antarctica ice sheet curvature and its relation with ice flow and boundary conditions.

Rémy, F., Minster, J.F., *Geophysical research letters,* May 1, 1997, 24(9), p.1039-1042, 18 refs.

Ice sheets, Glacier flow, Glacier surfaces, Topographic surveys, Topographic features, Remote sensing, Radiometry, Height finding, Slope orientation, Rheology

The map of the antarctic ice sheet surface curvature in the across-slope direction shows a very coherent pattern, related to ice flow anomalies of each flowline with respect to adjacent ones. Near the coast, these anomalies are correlated to bedrock features which suggests that they result from outlet flow conditions that are transmitted from coast to domes. As a consequence, they should represent the drainage pattern, glacier positions and 3-dimensional flowline directions. Thus a large part of the ice sheet flow pattern seems controlled by outflow boundary conditions which can be empirically estimated. (Auth.)

51-4512

On the influence of electrostatic charging on coagulation of dust and ice particles in the upper mesosphere.

Reid, G.C., *Geophysical research letters,* May 1, 1997, 24(9), p.1095-1098, 15 refs.

Polar atmospheres, Atmospheric electricity, Static electricity, Ice crystal growth, Aerosols, Dust, Heterogeneous nucleation, Coagulation, Ionization, Electric charge, Diurnal variations, Polarization (charge separation)

51-4513

Evidence for long-term cooling of the upper atmosphere in ionosonde data.

Ulich, T., Tukrunen, E., *Geophysical research letters,* May 1, 1997, 24(9), p.1103-1106, 17 refs.

Polar atmospheres, Climatic changes, Atmospheric electricity, Electric fields, Greenhouse effect, Cooling, Sounding, Height finding, Statistical analysis, Seasonal variations

51-4514

High resolution measurements in the summer polar mesosphere.

Rüster, R., *Geophysical research letters,* May 1, 1997, 24(9), p.1115-1118, 16 refs.

Polar atmospheres, Atmospheric electricity, Electric fields, Sounding, Radar echoes, Gravity waves, Wave propagation, Statistical analysis, Air temperature, Spectra, Correlation

51-4515

Tomographic reconstruction of 630.0 nm emission structure for a polar cap arc.

Doe, R.A., Kelly, J.D., Semeter, J.L., Steele, D.P., *Geophysical research letters,* May 1, 1997, 24(9), p.1119-1122, 11 refs.

Atmospheric electricity, Polar atmospheres, Electric corona, Imaging, Geomagnetism, Ionization, Ion diffusion, Brightness, Profiles, Statistical analysis

51-4516

Detection of SO_2 on Callisto with the Hubble Space Telescope.

Noll, K.S., Johnson, R.E., McGrath, M.A., Caldwell, J.J., *Geophysical research letters,* May 1, 1997, 24(9), p.1139-1142, 24 refs.

Satellites (natural), Remote sensing, Extraterrestrial ice, Ice detection, Ice spectroscopy, Radiation absorption, Spectra, Ultraviolet radiation, Albedo

51-4517

IUE's view of Callisto: detection of an SO_2 absorption correlated to possible torus neutral wind alterations.

Lane, A.L., Domingue, D.L., *Geophysical research letters,* May 1, 1997, 24(9), p.1143-1146, 28 refs.

Satellites (natural), Extraterrestrial ice, Ultraviolet radiation, Solar radiation, Remote sensing, Ground ice, Ice detection, Albedo, Spectra

51-4518

Formation of the ice cover's flexural oscillations by action of surface and internal ship waves—part II. Internal wave manifestations in ice bend.

Bukatov, A.E., Zharkov, V.V., *International journal of offshore and polar engineering,* June 1997, 7(2), p.81-88, 33 refs.

Sea ice, Ice deformation, Flexural strength, Oscillations, Ice water interface, Ships, Hydrodynamics, Water waves, Wave propagation, Mathematical models, Dynamic loads, Ice cover effect

51-4519

Limiting current increase of oxidation of ferrocyanide anions in water and electrolyte solutions during freezing.

Tanaka, K., Hasebe, T., *Journal of electroanalytical chemistry,* Jan. 24, 1995, 401(1-2), p.163-169, 21 refs.

Frozen liquids, Ice physics, Solutions, Phase transformations, Freezing points, Ion diffusion, Liquid phases, Solubility, Mass transfer, Electrical resistivity, Correlation, Temperature effects

51-4520

Modern benthic foraminifer distribution in the Amerasian Basin, Arctic Ocean.

Ishman, S.E., Foley, K.M., *Micropaleontology,* 1996, 42(2), p.206-220, 21 refs.

Oceanographic surveys, Ecosystems, Marine biology, Biomass, Classifications, Ocean bottom, Drill core analysis, Sampling, Statistical analysis, Distribution, Arctic Ocean

51-4521

Dielectric properties of $CA(OH)_2$-doped ice.

Sasaki, H., Kodera, E., *Physical Society of Japan. Journal,* July 1996, 65(7), p.2343-2344, 8 refs.

Ice physics, Doped ice, Ice crystal growth, Ice dielectrics, Dielectric properties, Ice relaxation, Electrical measurement, Temperature effects, Ion diffusion

51-4522

Ice thermal storage system for Kioi Hall.

Igarashi, M., Yamada, S., Fukushima, T., *Nippon Steel technical report,* Jan. 1996, No.68, p.45-49, 4 refs.

Buildings, Ice makers, Ice (water storage), Electric power, Heat recovery, Cooling systems, Ice water interface, Heat transfer, Phase transformations, Supercooling, Design, Temperature control

51-4523

Glass transitions in aqueous carbohydrate solutions and their relevance to frozen food stability.

Goff, H.D., Sahagian, M.E., *Thermochimica acta,* July 1, 1996, Vol.280/281, p.449-464, 71 refs.

Frozen liquids, Solutions, Polymers, Ice water interface, Ice formation, Recrystallization, Phase transformations, Freezing rate, Freezing points, Preserving, Stability, Viscosity, Supersaturation

51-4524

Radioactivity in cod from the Barents Sea. German contribution to the Arctic Monitoring and Assessment Programme. [Radioaktivität im Kabeljau (*Gadus morhua*) der Barentssee. Deutscher Beitrag zum Arctic Monitoring and Assessment Programme]

Kellermann, H.J., *Deutsche Hydrographische Zeitschrift,* 1996, Suppl.6, Scientific Symposium, 6th, Hamburg, Germany, May 14-15, 1996. Real problems of world oceans, p.99-104, In German with English summary. 9 refs.

Oceanographic surveys, Marine biology, Ecosystems, Radioactive wastes, Hydrocarbons, Water pollution, Environmental impact, Monitors, Research projects, International cooperation, Arctic Ocean

51-4525

Mathematical features of Hibler's model of large-scale sea-ice dynamics.

Kleine, E., Sklyar, S., *Deutsche Hydrographische Zeitschrift,* 1995, 47(3), p.179-230, With German summary. 64 refs.

Oceanography, Sea ice, Ice cover strength, Ice floes, Ice mechanics, Ice water interface, Air ice water interaction, Ice models, Mathematical models, Viscoelasticity, Drift, Ice deformation

51-4526

Forcing of the austral autumn surface pressure change over the antarctic continent.

Parish, T.R., Wang, Y.H., Bromwich, D.H., *Journal of the atmospheric sciences,* June 1, 1997, 54(11), p.1410-1422, 28 refs.

Climatology, Wind velocity, Atmospheric circulation, Atmospheric pressure, Surface temperature, Seasonal variations, Ice sheets, Ice air interface, Ice cover effect, Heat transfer, Mass transfer, Simulation

Pronounced seasonal variations in the surface pressure field are present over the antarctic continent. Surface pressures over the ice sheet decrease during the austral autumn period Jan.-Apr. and increase during the austral springtime months Sep.-Dec. The largest changes are found over the highest portions of the antarctic ice sheets where seasonal surface pressure changes of up to 20 hPa are common. The outstanding feature of these surface pressure changes is that typically the isallobaric contours closely follow the antarctic orography during both transition periods, suggesting a strong seasonal diabatic adjustment within the lower troposphere. During austral autumn, the pronounced cooling of the lower atmosphere adjacent to the ice sheets leads to an enhancement of the antarctic katabatic wind regime and hence the lower branch of the mean meridional circulation over the high southern latitudes. The mass transport provided by these drainage flows is proposed as the mechanism behind the autumn pressure falls. Numerical simulations of the evolution of the antarctic katabatic wind regime indicate that the radiative cooling of the sloping ice fields and attendant mass transport result in a modification of the temperature and pressure fields in the lower troposphere similar to what is seen during the early austral autumn period. (Auth.)

51-4527

Development of antarctic katabatic winds and implications for the coastal ocean.

Davis, A.M.J., McNider, R.T., *Journal of the atmospheric sciences,* May 1, 1997, 54(9), p.1248-1261, 19 refs.

Oceanography, Ocean currents, Stratification, Shores, Upwelling, Wind velocity, Wind direction, Topographic effects, Polynyas, Air ice water interaction, Mathematical models

The influence of katabatic winds on the antarctic coastal waters is examined by using simple models of the ocean and atmosphere. A katabatic flow model incorporating Coriolis dynamics is solved analytically and another with nonlinear friction is solved numerically to provide wind stress to a two-layer coastal ocean model. The resulting solutions are evidently the first to incorporate Coriolis terms with a thermodynamic equation that includes compressional warming effects. The emphasis in this paper is on delineating the parameters that control the relative adjustment of the katabatic wind into alongshore and offshore components. The ocean model shows that significant downwelling occurs at the coast, while upwelling is predicted at a distance of the order of the ocean Rossby radius. An alongshore coastal jet from the east is found in the model and is evidently the manifestation of the east wind drift. The upwelling offshore may be a significant aspect of polynya formation and maintenance of the antarctic divergence zone and contributes to the biological productivity of the region. (Auth. mod.)

51-4528

Andean glacial lakes and climate variability since the last glacial maximum.

Seltzer, G.O., Rodbell, D.T., Abbott, M., *Bulletin de l'Institut français d'études andines,* 1995, 24(3), Seminar on Water, Glaciers and Climatic Changes in the Tropical Andes. La Paz, Bolivia, June 13-16, 1995, p.539-549, With Spanish and French summaries. 41 refs.

Paleoclimatology, Glacial geology, Glacier oscillation, Climatic changes, Alpine landscapes, Glacial lakes, Lacustrine deposits, Radioactive age determination, Statistical analysis, Stratigraphy, Bolivia—Andes

51-4529

Paleohydrology of the last 25,000 years in the Bolivian Andes. [Paleohidrología de los últimos 25 000 años en los Andes bolivianos]

Argollo, J., Mourguiart, P., *Bulletin de l'Institut français d'études andines,* 1995, 24(3), Seminar on Water, Glaciers and Climatic Changes in the Tropical Andes. La Paz, Bolivia, June 13-16, 1995, p.551-562, In Spanish with French and English summaries. 36 refs.

Alpine landscapes, Limnology, Palynology, Lacustrine deposits, Water level, Glacier oscillation, Paleoclimatology, Climatic changes, Glacial deposits, Quaternary deposits, Radioactive age determination, Bolivia—Andes

51-4530

Last glacial cycle and palaeolake synchrony in the southern Bolivian Altiplano: Cerro Azanaques case study.

Clayton, J.D., Clapperton, C.M., *Bulletin de l'Institut français d'études andines,* 1995, 24(3), Seminar on Water, Glaciers and Climatic Changes in the Tropical Andes. La Paz, Bolivia, June 13-16, 1995, p.563-571, With Spanish and French summaries. 11 refs.

Glacial geology, Glacier oscillation, Pleistocene, Paleoclimatology, Limnology, Geomorphology, Shoreline modification, Lacustrine deposits, Glacial deposits, Quaternary deposits, Stratigraphy, Bolivia—Titicaca, Lake

51-4531

Holocene environmental changes in the Atacama Altiplano and paleoclimatic implications.

Grosjean, M., et al, *Bulletin de l'Institut français d'études andines,* 1995, 24(3), Seminar on Water, Glaciers and Climatic Changes in the Tropical Andes. La Paz, Bolivia, June 13-16, 1995, p.585-594, With Spanish and French summaries. 21 refs.

Paleoclimatology, Climatic changes, Precipitation (meteorology), Atmospheric circulation, Humidity, Lacustrine deposits, Water level, Stratigraphy, Radioactive age determination, Chile—Atacama Altiplano

51-4532

Modern and last glacial maximum snowline in Peru and Bolivia: implications for regional climatic change.

Klein, A.G., Isacks, B.L., Bloom, A.L., *Bulletin de l'Institut français d'études andines,* 1995, 24(3), Seminar on Water, Glaciers and Climatic Changes in the Tropical Andes. La Paz, Bolivia, June 13-16, 1995, p.607-617, With Spanish and French summaries. 20 refs.

Paleoclimatology, Climatic changes, Glacier oscillation, Snow line, Snow cover distribution, Snow surveys, Sensor mapping, LANDSAT, Periodic variations, Peru, Bolivia

51-4533

Late Holocene ice core records of climate and environment from the tropical Andes, Peru.

Thompson, L.G., *Bulletin de l'Institut français d'études andines,* 1995, 24(3), Seminar on Water, Glaciers and Climatic Changes in the Tropical Andes. La Paz, Bolivia, June 13-16, 1995, p.619-629, With Spanish and French summaries. 10 refs.

Paleoclimatology, Climatic changes, Mountain glaciers, Glacier oscillation, Ice cores, Aerosols, Dust, Sampling, Ice dating, Isotope analysis, Peru—Andes

51-4534

Glacier recession on Mount Kenya in the context of the global tropics.

Hastenrath, S., *Bulletin de l'Institut français d'études andines,* 1995, 24(3), Seminar on Water, Glaciers and Climatic Changes in the Tropical Andes. La Paz, Bolivia, June 13-16, 1995, p.633-638, With Spanish and French summaries. 12 refs.

Mountain glaciers, Glacier oscillation, Glacier melting, Climatic changes, Global warming, Kenya—Kenya, Mount

51-4535

Climatic variability and hydrological modelling on Zongo Glacier, Bolivia. [Variabilidad climática y modelización hidrológica del Glaciar Zongo, Bolivia]

Ribstein, P., Francou, B., Rigaudière, P., Saravia, R., *Bulletin de l'Institut français d'études andines,* 1995, 24(3), Seminar on Water, Glaciers and Climatic Changes in the Tropical Andes. La Paz, Bolivia, June 13-16, 1995, p.639-649, In Spanish with French and English summaries. 14 refs.

Glacial hydrology, Mountain glaciers, Glacier oscillation, Runoff, Watersheds, Glacial meteorology, Climatic changes, Global change, Heat balance, Statistical analysis, Seasonal variations, Models, Bolivia—Glacier Zongo

51-4536

Snowmelt and runoff forecast mathematical simulation. [Simulación matemática de la fusión nival y pronóstico de escurrimiento]

Maza, J., Fornero, L., Yañez, H., *Bulletin de l'Institut français d'études andines,* 1995, 24(3), Seminar on Water, Glaciers and Climatic Changes in the Tropical Andes. La Paz, Bolivia, June 13-16, 1995, p.651-659, In Spanish with French and English summaries. 6 refs.

Watersheds, Runoff forecasting, Snow hydrology, Snow surveys, Snowmelt, Snow cover distribution, Mathematical models, Simulation, Spaceborne photography

51-4537

Glacier balance and climate in Bolivia and Peru: effects of ENSO events. [Balances de glaciares y clima en Bolivia y Perú: impacto de los eventos ENSO]

Francou, B., Ribstein, P., Sémiond, H., Portocarrero, C., Rodríguez, A., *Bulletin de l'Institut français d'études andines,* 1995, 24(3), Seminar on Water, Glaciers and Climatic Changes in the Tropical Andes. La Paz, Bolivia, June 13-16, 1995, p.661-670, In Spanish with French and English summaries. 13 refs.

Mountain glaciers, Glacier ablation, Glacier mass balance, Climatic factors, Precipitation (meteorology), Atmospheric circulation, Temperature effects, Statistical analysis, Bolivia, Peru

51-4538

Some notes on the behaviour of tropical glaciers.

Kaser, G., *Bulletin de l'Institut français d'études andines,* 1995, 24(3), Seminar on Water, Glaciers and Climatic Changes in the Tropical Andes. La Paz, Bolivia, June 13-16, 1995, p.671-681, With Spanish and French summaries. 34 refs.

Mountain glaciers, Glacier oscillation, Glacier ablation, Climatic changes, Snow line, Glacier tongues, Glacier mass balance, Precipitation (meteorology), Statistical analysis

51-4539

Variations of a mountain glacier in the central Chilean Andes during the last twenty years. [Variaciones de un glaciar de montaña en los Andes de Chile Central en las últimas dos décadas]

Escobar, F., Casassa, G., Pozo, V., *Bulletin de l'Institut français d'études andines,* 1995, 24(3), Seminar on Water, Glaciers and Climatic Changes in the Tropical Andes. La Paz, Bolivia, June 13-16, 1995, p.683-695, In Spanish with French and English summaries. 11 refs.

Mountain glaciers, Glacier surveys, Glacier mass balance, Glacier oscillation, Seasonal variations, Statistical analysis, Chile—Andes

51-4540

Glacier retreat in Peru: consequences on water resources and geodynamic hazards. [Retroceso de glaciares en el Perú: consecuencias sobre los recursos hídricos y los riesgos geodinámicos]

Portocarrero, C., *Bulletin de l'Institut français d'études andines,* 1995, 24(3), Seminar on Water, Glaciers and Climatic Changes in the Tropical Andes. La Paz, Bolivia, June 13-16, 1995, p.697-706, In Spanish with French and English summaries. 7 refs.

Mountain glaciers, Glacier mass balance, Glacier ablation, Runoff, Geomorphology, Water supply, Glacial hydrology, Glacial lakes, Lake bursts, Safety, Countermeasures, Peru

51-4541

Glacier monitoring network in the tropical Andes. [Un réseau d'observation des glaciers dans les Andes tropicales]

Pouyaud, B., Francou, B., Ribstein, P., *Bulletin de l'Institut français d'études andines,* 1995, 24(3), Seminar on Water, Glaciers and Climatic Changes in the Tropical Andes. La Paz, Bolivia, June 13-16, 1995, p.707-714, In French with Spanish and English summaries. 23 refs.

Mountain glaciers, Glacier surveys, Monitors, Climatic changes, Glacier oscillation, Glacier ablation, Water supply, Safety, Andes

51-4542

Capabilities of microwave sensors for monitoring areal extent and physical properties of the snowpack.

Rott, H., NATO Advanced Research Workshop on Global Environmental Change and Land Surface Processes in Hydrology: the Trials and Tribulations of Modeling and Measuring, Tucson, AZ, May 17-21, 1993. Proceedings. Edited by S. Sorooshian et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.46, Berlin, Springer-Verlag, 1997, p.135-167, 38 refs.

DLC GB656.2.M33 L36

Snow surveys, Spaceborne photography, Microwaves, Radiometry, Synthetic aperture radar, Sensor mapping, Snow cover distribution, Snow optics, Wet snow, Wave propagation, Backscattering, Transmissivity, Snow cover effect, Performance

51-4543

Challenges we face: panel discussion on snow.

Gupta, H., ed, Sorooshian, S., ed, NATO Advanced Research Workshop on Global Environmental Change and Land Surface Processes in Hydrology: the Trials and Tribulations of Modeling and Measuring, Tucson, AZ, May 17-21, 1993. Proceedings. Edited by S. Sorooshian et al and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.46, Berlin, Springer-Verlag, 1997, p.183-187.

DLC GB656.2.M33 L36

Snow surveys, Snow cover distribution, Snow hydrology, Terminology, Classifications, Remote sensing, Accuracy, Models

51-4544

Liquid calcium chloride helps keep Michigan's roads to the slopes open.

Gall, J., *Roads & bridges,* June 1996, 34(6), p.58-60.

Road maintenance, Winter maintenance, Road icing, Snow removal, Salting, Chemical ice prevention, Solutions, Cold weather performance

51-4545

Liquid CC hard on ice, easy on corrosion.

Beazley, S., Sadar, B., Brown, P., *Roads & bridges,* June 1996, 34(6), p.61-63.

Road maintenance, Winter maintenance, Road icing, Ice removal, Ice control, Chemical properties, Chemical ice prevention, Solutions, Corrosion, Environmental protection

51-4546

GPS latest ally in war on winter snow, ice.

Banasiak, D., ed, *Roads & bridges,* June 1996, 34(6), p.67.

Road maintenance, Winter maintenance, Snowstorms, Snow removal, Logistics, Radio communication, Computer programs, Computer applications

51-4547

Blizzard of '96.

Geistlinger, L., *Roads & bridges,* Mar. 1996, 34(3), p.48-54.

Precipitation (meteorology), Snowstorms, Records (extremes), Snow removal, Road maintenance, Winter maintenance, Logistics, Cold weather performance

51-4548

Blizzard of '96: midwest edition.

Dickinson, J.B., *Roads & bridges,* Mar. 1996, 34(3), p.55-58.

Snowstorms, Records (extremes), Snow removal, Road maintenance, Winter maintenance, Cold weather performance, Safety

51-4549

Reliability of the PMS FSSP in the presence of small ice crystals.

Gayet, J.F., Febvre, G., Larsen, H., *Journal of atmospheric and oceanic technology,* Dec. 1996, 13(6), p.1300-1310, 27 refs.

Climatology, Cloud physics, Condensation trails, Remote sensing, Spectroscopy, Probes, Ice detection, Ice crystal size, Ice crystal optics, Particle size distribution, Spectra, Accuracy

51-4550

Accumulation of strontium-90 in bottom deposits and biota of the Barents Sea and the Kara Sea.

Matishov, G.G., Matishov, D.G., Rissanen, C., *Doklady biological sciences,* Mar.-Apr. 1997, 353(1-6), p.187-189, Translated from Doklady Akademii nauk. 12 refs.

Oceanography, Marine biology, Bottom sediment, Water pollution, Biomass, Radioactivity, Radioactive wastes, Sampling, Radioactive isotopes, Fallout, Environmental tests, Barents Sea, Russia—Kara Sea

51-4551

Net terrestrial carbon exchange from mass balance calculations: an uncertainty estimate.

Craig, S., Holmén, K., Björkström, A., *Tellus,* Apr. 1997, 49B(2), p.136-148, 34 refs.

Climatology, Global change, Atmospheric composition, Mass balance, Carbon dioxide, Geochemical cycles, Ice sheets, Ice cores, Sampling, Correlation, Statistical analysis

One classical method of determining the net exchange of carbon between the atmosphere and the terrestrial biosphere is to perform a mass balance on atmospheric CO_2 over time. In this calculation, the residual flux needed to balance the carbon budget when fossil fuel emissions, ocean uptake, and the documented increase of atmospheric CO_2 concentrations are taken into account, is interpreted as being net terrestrial carbon exchange. In this study, the uncertainties in such a calculation are investigated and related to the magnitude of the "missing carbon sink" as a function of time. The difficulties in assigning a precise uncertainty estimate for the CO_2 growth rate from the antarctic ice core record are illustrated. It is then shown that the missing sink is significantly different from zero from the 1950s, to the present day, even when all the uncertainties are taken into consideration. Finally, it is pointed out that the uncertainties in the cumulative carbon budget imbalance may be larger than previously thought. (Auth. mod.)

51-4552

Formation of particulate MSA: deductions from size distribution measurements in the Finnish Arctic.

Kerminen, V.M., Aurela, M., Hillamo, R.E., Virkkula, A., *Tellus,* Apr. 1997, 49B(2), p.159-171, 45 refs.

Climatology, Polar atmospheres, Marine atmospheres, Air pollution, Atmospheric composition, Aerosols, Particle size distribution, Atmospheric circulation, Mass transfer, Sampling, Environmental tests, Finland

51-4553

Preglacial surface remnants and Quaternary glacial regimes in northwestern Sweden.

Kleman, J., Stroeven, A.P., *Geomorphology,* May 1997, 19(1-2), p.35-54, 51 refs.

Geomorphology, Pleistocene, Subarctic landscapes, Landscape development, Mountain glaciers, Glacial geology, Glacial erosion, Subglacial drainage, Stereophotography, Geological maps, Sweden

51-4554

1994 jökulhlaup at Farrow Creek, British Columbia, Canada.

Clague, J.J., Evans, S.G., *Geomorphology,* May 1997, 19(1-2), p.77-87, 24 refs.

Geomorphology, Glacial hydrology, Glacial lakes, Lake bursts, Flooding, Water erosion, Subglacial drainage, Sediment transport, Damage, Photointerpretation, Canada—British Columbia—Farrow Creek

51-4555

Ion transfer of tetraalkylammonium cations at an interface between frozen aqueous solution and 1,2-dichloroethane.

Rahman, M.A., Doe, H., *Journal of electroanalytical chemistry,* Mar. 15, 1997, 424(1-2), p.159-164, 33 refs.

Solutions, Frozen liquids, Liquid solid interfaces, Ion exchange, Ion diffusion, Solubility, Dielectric properties, Electrical resistivity, Electrical measurement, Thermodynamic properties, Mass transfer

51-4556

Optical properties of two-layered spheroidal dust grains.

Somsikov, V.V., *Astronomy letters,* Sep.-Oct. 1996, 22(5), p.625-631, Translated from Pis'ma v astronomicheskiĭ zhurnal. 20 refs.

Cosmic dust, Extraterrestrial ice, Ice solid interface, Ice optics, Ice crystal structure, Optical properties, Light scattering, Attenuation, Polarization (waves), Analysis (mathematics)

51-4557

Why is soluble silicon in interstitial and lake ice water samples immobilized by freezing?

Tallberg, P., Hartikainen, H., Kairesalo, T., *Water research,* Jan. 1997, 31(1), p.130-134, 13 refs.

Limnology, Lake water, Lake ice, Water chemistry, Lacustrine deposits, Polymers, Colloids, Sampling, Accuracy, Filters, Geochemistry, Cold storage, Freeze thaw tests, Degradation

51-4558

Characterization of land surface thermal structure from NOAA-AVHRR data over a northern ecosystem.

Goïta, K., Royer, A., Buissières, N., *Remote sensing of environment,* June 1997, 60(3), p.282-298, 58 refs.

Landscape types, Forest ecosystems, Remote sensing, Classifications, Surface temperature, Spaceborne photography, Radiometry, Tundra terrain, Taiga, Lichens, Infrared reconnaissance, Water vapor, Reflectivity, Correlation

51-4559

Passive microwave algorithms for sea ice concentration: a comparison of two techniques.

Comiso, J.C., Cavalieri, D.J., Parkinson, C.L., Gloersen, P., *Remote sensing of environment,* June 1997, 60(3), p.357-384, 36 refs.

Sea ice distribution, Ice surveys, Sensor mapping, Radiometry, Brightness, Classifications, Models, Statistical analysis

Two algorithms that have been used for deriving polar sea ice concentrations from multichannel data are compared. One is the NASA Team algorithm and the other is the Bootstrap algorithm, both of which were developed at NASA's Goddard Space Flight Center. The two algorithms use different channel combinations, reference brightness temperatures, weather filters, and techniques. To assess the difference in the performance of the two algorithms, analyses were performed with data from both hemispheres and for all seasons. The results show only small differences in the central Arctic in winter but larger disagreements in the seasonal regions and in summer. In some areas in the Antarctic, the Bootstrap technique shows ice concentrations higher than those of the Team algorithm by as much as 25%; whereas, in other areas, it shows ice concentrations lower by as much as 30%. The differences in the results are caused by temperature effects, emissivity effects, and tie point differences. The Team and the Bootstrap results were compared with available Landsat, advanced very high resolution radiometer and synthetic aperture radar data. All yield higher concentrations than the passive microwave algorithms. (Auth. mod.)

51-4560

Paleomagnetism of Canadian arctic permafrost; Quaternary magnetostratigraphy of the Mackenzie Delta.

Wang, Y., Evans, M.E., *Canadian journal of earth sciences,* Feb. 1997, 34(2), p.135-139, With French summary. 11 refs.

Permafrost surveys, Quaternary deposits, Permafrost structure, Stratigraphy, Geomagnetism, Deltas, Geophysical surveys, Sampling, Drill core analysis, Remanent magnetism, Profiles, Geochronology, Canada—Northwest Territories—Mackenzie Delta

51-4561

Geology, U-Pb, and Pb-Pb geochronology of the Lake Harbour area, southern Baffin Island: implications for the Paleoproterozoic tectonic evolution of northeastern Laurentia.

Scott, D.J., *Canadian journal of earth sciences,* Feb. 1997, 34(2), p.140-155, With French summary. 47 refs.

Geochronology, Pleistocene, Subarctic landscapes, Tectonics, Magma, Geologic processes, Earth crust, Lithology, Isotope analysis, Radioactive age determination, Canada—Northwest Territories—Baffin Island

51-4562

Late Wisconsinan erosion and eolian deposition, Summer Island area, Pleistocene Mackenzie Delta, Northwest Territories: optical dating and implications for glacial chronology.

Murton, J.B., French, H.M., Lamothe, M., *Canadian journal of earth sciences,* Feb. 1997, 34(2), p.190-199, With French summary. 43 refs.

Pleistocene, Glacier oscillation, Geochronology, Ice wedges, Permafrost structure, Meltwater, Water erosion, Outwash, Eolian soils, Sedimentation, Luminescence, Soil dating, Stratigraphy, Canada—Northwest Territories—Mackenzie Delta

51-4563

Aufeis in the Ivishak River, Alaska, mapped from satellite radar interferometry.

Li, S.S., Benson, C., Shapiro, L., Dean, K., *Remote sensing of environment,* May 1997, 60(2), p.131-139, 23 refs.

Spaceborne photography, Subarctic landscapes, Sensor mapping, Synthetic aperture radar, Naleds, Distribution, River ice, Ice growth, Banks (waterways), River ice, Image processing, United States—Alaska—Ivishak River

51-4564

Capability of multitemporal ERS-1 SAR data for wet-snow mapping.

Baghdadi, N., Gauthier, Y., Bernier, M., *Remote sensing of environment,* May 1997, 60(2), p.174-186, 22 refs.

Snow cover structure, Sensor mapping, Snow surveys, Wet snow, Spaceborne photography, Synthetic aperture radar, Backscattering, Image processing, Correlation, Runoff forecasting

51-4565

4D marine data model: design and application in ice monitoring.

Hamre, T., Mughal, K.A., Jacob, A., *Marine geodesy,* Apr.-Sep. 1997, 20(2-3), p.121-136, 18 refs.

Sea ice distribution, Oceanographic surveys, Ice surveys, Ice reporting, Ice forecasting, Remote sensing, Classifications, Data processing, Computerized simulation, Computer programs

51-4566

Freeze desalination using hydraulic refrigerant compressors.

Rice, W., Chau, D.S.C., *Desalination,* May 1997, 109(2), p.157-164, 17 refs.

Sea water freezing, Water chemistry, Desalting, Brines, Bubbling, Refrigeration, Fluid flow, Compressors, Evaporation, Vapor pressure, Ice water interface

51-4567

Accumulation of sulphur in and on Scots pine needles in the subarctic.

Manninen, S., Huttunen, S., Kontio, M., *Water, air, and soil pollution,* Apr. 1997, 95(1-4), p.147-164, Refs. p.161-164.

Forest ecosystems, Plant physiology, Air pollution, Gases, Plant tissues, Damage, Sampling, Ion density (concentration), Environmental tests, Standards, Statistical analysis

51-4568

Use of bulk collectors in monitoring wet deposition at high-altitude sites in winter.

Ranalli, A.J., Turk, J.T., Campbell, D.H., *Water, air, and soil pollution,* Apr. 1997, 95(1-4), p.237-255, 20 refs.

Precipitation gages, Sensors, Snow samplers, Snowfall, Precipitation (meteorology), Snow composition, Accuracy, Statistical analysis, Ion density (concentration), Seasonal variations

51-4569

Improvement of the method for frost testing of hydraulically bound base courses—pt.1: literature study; pt.2: research program, modified examination. [Verbesserung des Verfahrens der Frostprüfung von hydraulisch gebundenen Tragschichten—Teil 1: Literaturstudium; Teil 2: Versuchsprogramm, modifiziertes Prüfverfahren]

Manns, W., Keppler, E., Neubert, B., *Forschung Straßenbau und Straßenverkehrstechnik,* 1996, Vol.722, 87p., In German with English and French summaries. 52 refs.

Pavement bases, Roadbeds, Admixtures, Fines, Freeze thaw tests, Freeze thaw cycles, Frost resistance, Temperature variations, Cold weather tests, Standards, Accuracy, Laboratory techniques

51-4570

Determination of the flow behaviour of bitumens and polymer-modified bitumens at low temperature. [Ansprache des Fließverhaltens von Bitumen und polymermodifizierten Bitumen bei tiefen Temperaturen]

Schellenberg, K., Eulitz, H.J., *Forschung Straßenbau und Straßenverkehrstechnik,* 1995, Vol.695, 95p., In German with English and French summaries. 20 refs.

Bitumens, Pavements, Admixtures, Polymers, Rheology, Low temperature tests, Viscosity, Shear properties, Temperature effects, Cold weather performance, Simulation

51-4571

Purple Saxifrage, *Saxifraga oppositifolia*, in Svalbard: two taxa or one.

Brysting, A.K., Gabrielsen, T.M., Sørlibråten, O., Ytrehorn, O., Brochmann, C., *Polar research,* Dec. 1996, 15(2), p.93-105, Refs. p.103-105.

Plant ecology, Ecosystems, Vegetation patterns, Growth, Distribution, Palynology, Classifications, Sampling, Statistical analysis, Correlation, Norway—Svalbard

51-4572

Penetration of ultraviolet B, blue and quanta irradiance into Svalbard waters.

Aas, E., Høkedal, J., *Polar research,* Dec. 1996, 15(2), p.127-138, 61 refs.

Oceanography, Subpolar regions, Solar radiation, Sea water, Optical properties, Ultraviolet radiation, Radiance, Radiation absorption, Attenuation, Photometry, Statistical analysis, Norway—Svalbard

51-4573

Landslides and relict ice margin landforms in Adventdalen, central Spitsbergen, Svalbard.

Sawagaki, T., Koaze, T., *Polar research,* Dec. 1996, 15(2), p.139-152, 32 refs.

Geomorphology, Arctic landscapes, Glacial geology, Glacial erosion, Glacier tongues, Landforms, Surface drainage, Moraines, Landslides, Classifications, Topographic features, Norway—Spitsbergen

51-4574

Additional Rb-Sr and single-grain zircon datings of Caledonian granitoid rocks from Albert I Land, northwest Spitsbergen.

Balashov, IU.A., Peucat, J.J., Teben'kov, A.M., Ohta, Y., Larionov, A.N., Sirotkin, A.N., *Polar research*, Dec. 1996, 15(2), p.153-165, 32 refs.

Geological surveys, Subpolar regions, Earth crust, Rock properties, Lithology, Geochronology, Classifications, Isotope analysis, Radioactive age determination, Norway—Spitsbergen

51-4575

RB-Sr whole rock and U-Pb zircon datings of the granitic-gabbroic rocks from the Skålfjellet Subgroup, southwest Spitsbergen.

Balashov, IU.A., et al, *Polar research*, Dec. 1996, 15(2), p.167-181, 33 refs.

Geological surveys, Subpolar regions, Pleistocene, Earth crust, Magma, Tectonics, Lithology, Stratigraphy, Isotope analysis, Radioactive age determination, Sampling, Rock properties, Norway—Spitsbergen

51-4576

Sediment transport to the Laptev Sea—hydrology and geochemistry of the Lena River.

Rachold, V., Alabian, A.M., Hubberten, H.W., Korotaev, V.N., Zaitsev, A.A., *Polar research*, Dec. 1996, 15(2), p.183-196, 32 refs.

Estuaries, River basins, Deltas, Marine deposits, Hydrologic cycle, Sediment transport, Surface drainage, Sampling, Hydrogeochemistry, Russia—Laptev Sea

51-4577

Impact of climate change on the snow cover pattern in Estonia.

Jaagus, J., *Climatic change*, May-June 1997, 36(1-2), p.65-77, 17 refs.

Snow cover distribution, Snow air interface, Atmospheric circulation, Climatic changes, Global warming, Air temperature, Seasonal variations, Hydrologic cycle, Statistical analysis, Estonia

51-4578

Oscillations of levels and cool phases of the Laurentian Great Lakes caused by inflows from glacial Lakes Agassiz and Barlow-Ojibway.

Lewis, C.F.M., Anderson, T.W., *Journal of paleolimnology*, 1989, 2(2), p.99-146, Refs. p.143-146.

Limnology, Paleoclimatology, Climatic changes, Lake water, Water level, Lacustrine deposits, Glacial lakes, Glacial hydrology, Meltwater, Water flow, Radioactive age determination, Drill core analysis, Stratigraphy, Great Lakes

51-4579

Sediment chemistry and diatom stratigraphy of two high arctic isolation lakes, Truelove Lowland, Devon Island, N.W.T., Canada.

Young, R.B., King, R.H., *Journal of paleolimnology*, 1989, 2(3), p.207-225, 33 refs.

Paleoecology, Limnology, Lacustrine deposits, Sedimentation, Isostasy, Geochemistry, Geomorphology, Drill core analysis, Stratigraphy, Geochronology, Statistical analysis, Canada—Northwest Territories—Devon Island

51-4580

Late Quaternary palaeoenvironment of Spring Lake, Alberta, Canada.

Hickman, M., White, J.M., *Journal of paleolimnology*, 1989, 2(4), p.305-317, 37 refs.

Limnology, Paleoclimatology, Paleoecology, Vegetation patterns, Climatic changes, Quaternary deposits, Lacustrine deposits, Drill core analysis, X ray analysis, X ray diffraction, Stratigraphy, Canada—Alberta—Spring Lake

51-4581

Borehole temperature record of climate warming in the mid-continent of North America.

Gosnold, W.D., Todhunter, P.E., Schmidt, W., *Global and planetary change*, June 1997, 15(1-2), p.33-45, 37 refs.

Climatology, Global warming, Precipitation (meteorology), Surface temperature, Soil temperature, Air temperature, Thermal diffusion, Boreholes, Profiles, Temperature measurement, Soil freezing, Latent heat, Frozen ground thermodynamics

51-4582

Cold-active enzymes from cold-adapted bacteria.

Morita, Y., Nakamura, T., Hasan, Q., Murakami, Y., Yokoyama, K., Tamiya, E., *American Oil Chemists' Society. Journal*, Apr. 1997, 74(4), p.441-444, 10 refs.

Soil microbiology, Snow cover effect, Bacteria, Cold tolerance, Growth, Ecology, Chemical properties, Classifications, Temperature effects, Sampling

51-4583

Seasonal changes in dehydration tolerance of xylem ray parenchyma cells of *Stylax obassia* twigs that survive freezing temperatures by deep supercooling.

Fujikawa, S., Kuroda, K., Ohtani, J., *Protoplasma*, 1997, 197(1-2), p.34-44, 32 refs.

Plant physiology, Trees (plants), Plant tissues, Frost resistance, Desiccation, Damage, Supercooling, Cold tolerance, Cold weather tests, Acclimatization, Structural analysis, Scanning electron microscopy

51-4584

Characterization of radiocaesium transport and retention in Nordic lakes.

Bjørnstad, H.E., Brittain, J.E., Saxén, R., Sundblad, B., Nordic radioecology—the transfer of radionuclides through Nordic ecosystems to man. Edited by H. Dahlgaard and Studies in Environmental Science. No.62, Amsterdam, Elsevier Science B.V., 1994, p.29-44, 19 refs.

DLC QH543.5.N67

Limnology, Lake water, Ecosystems, Fallout, Radioactivity, Radioactive isotopes, Spectroscopy, Water pollution, Sedimentation, Water transport, Snowmelt, Meltwater, Sampling, Environmental tests, Finland

51-4585

Distribution of radioactive caesium in boreal forest ecosystems.

Bergman, R., Nordic radioecology—the transfer of radionuclides through Nordic ecosystems to man. Edited by H. Dahlgaard and Studies in Environmental Science. No.62, Amsterdam, Elsevier Science B.V., 1994, p.335-379, Refs. p.374-379.

DLC QH543.5.N67

Air pollution, Soil pollution, Fallout, Distribution, Radioactive isotopes, Environmental impact, Forest ecosystems, Lichens, Snow impurities, Snowmelt, Snow cover effect, Snow air interface, Statistical analysis

51-4586

Snow survey bulletin—June 1, 1993.

British Columbia. BC Environment. Water Management Division, Victoria, British Columbia, 1993, 47p.

Snow surveys, Snow hydrology, Snow accumulation, Snowmelt, Snow cover distribution, Runoff, Hydrography, Seasonal variations, Canada—British Columbia

51-4587

Snow survey bulletin—March 1, 1995.

British Columbia. BC Environment. Water Management Division, Victoria, British Columbia, 1995, 60p.

Snow surveys, Snow hydrology, Snow accumulation, Snow cover distribution, Snow water equivalent, Runoff, Hydrography, Statistical analysis, Seasonal variations, Canada—British Columbia

51-4588

Formations generated by catastrophic rockfalls: alpine examples. [Les formations liées à des écroulements rocheux: exemples alpins]

Lhenaff, R., *Quaternaire*, 1996, 7(2-3), p.69-74, In French with English summary. 6 refs.

Alpine landscapes, Slope processes, Geomorphology, Rock mechanics, Rock streams, Landslides, Talus, Sediment transport, Alps

51-4589

Rock-avalanche of February 1995 at Claix (French Alps): sedimentology. [Sédimentologie d'une avalanche rocheuse survenue en février 1995 à Claix (Alpes françaises)]

Bertran, P., *Quaternaire*, 1996, 7(2-3), p.75-83, In French with English summary. 21 refs.

Alpine landscapes, Geomorphology, Slope processes, Mass flow, Mass movements (geology), Rock mechanics, Avalanches, Talus, Lithology, France—Alps

51-4590

Hard to melt.

Mukerjee, M., *Scientific American*, Dec. 1996, 275(6), p.33,36.

Ice physics, Ice melting, Melting points, Superheated ice, Clathrates, Extraterrestrial ice, Simulation, Thermodynamics

51-4591

Energy balance of the winter boreal landscape.

Harding, R.J., Pomeroy, J.W., *Journal of climate*, Nov. 1996, 9(11), p.2778-2787, 17 refs.

Climatology, Forest canopy, Evaporation, Landscape types, Surface energy, Heat balance, Snow accumulation, Snow cover effect, Turbulent boundary layer, Icebound lakes, Snow heat flux, Seasonal variations

51-4592

Seasonal variation of liquid and ice water path in nonprecipitating clouds over oceans.

Lin, B., Rossow, W.B., *Journal of climate*, Nov. 1996, 9(11), p.2890-2902, 61 refs.

Cloud cover, Classifications, Climatology, Cloud physics, Marine atmospheres, Radiometry, Optical properties, Ice detection, Ice crystals, Water content, Water vapor, Seasonal variations

51-4593

Changes in ultrastructure of *Picea abies* needles following severe long-term winter frost.

Wulff, A., *Scandinavian journal of forest research*, 1996, 11(4), p.327-335, 43 refs.

Trees (plants), Frost resistance, Cold stress, Plant tissues, Damage, Microstructure, Electrical resistivity, Temperature effects

51-4594

Antifreeze proteins in winter rye.

Griffith, M., et al, *Physiologia plantarum*, June 1997, 100(2), p.327-332, 43 refs.

Plant physiology, Grasses, Plant tissues, Acclimatization, Cold tolerance, Antifreezes, Ice prevention, Ice crystal growth, Chemical analysis, Chemical composition

51-4595

Ultrastructural changes induced by sub-zero temperatures in the plasma membrane of protoplasts from winter rye.

Pihakaski-Maunsbach, K., Kukkonen, M., *Physiologia plantarum*, June 1997, 100(2), p.333-340, 30 refs.

Plant physiology, Grasses, Freezing, Ice crystal growth, Plant tissues, Phase transformations, Damage, Microstructure, Cooling rate, Thin sections, Scanning electron microscopy, Cold tolerance

51-4596

Influence of precipitation and snow melt on the development of floods in low mountain ranges. [Der Einfluß von Niederschlag und Schneeschmelze auf die Hochwasserbildung im Mittelgebirge]

Guttenberger, J., *Meteorologische Zeitschrift*, Dec. 1995, 4(6), p.246-256, In German with English summary. 19 refs.

Watersheds, River basins, Mountains, Climatic changes, Snow hydrology, Snowmelt, River flow, Hydrography, Snow water equivalent, Meteorological factors, Flood forecasting, Statistical analysis, Seasonal variations

51-4597

On the influence of bulk-parameterization schemes of cloud microphysics on the predicted water-cycle-relevant quantities—a case study.

Mölders, N., Kramm, G., Laube, M., Raabe, A., *Meteorologische Zeitschrift*, Feb. 1997, 6(1), p.21-32, With German summary. 42 refs.

Precipitation (meteorology), Hydrologic cycle, Cloud physics, Cloud cover, Synoptic meteorology, Profiles, Turbulent exchange, Snow pellets, Glaze, Ice crystal growth, Classifications, Mathematical models, Evapotranspiration

51-4598

Experimental constraints on gravity wave parameterization from in situ measurements of temperature and turbulence.

Lübken, F.J., NATO Advanced Research Workshop on Gravity Wave Processes and Their Parameterization in Global Climate Models, Santa Fe, NM, Apr. 1-5, 1996. Proceedings and NATO Advanced Science Institutes, Series I. Global Environmental Change. Vol.50, Berlin, Springer-Verlag, 1997, p.69-84, Refs. p.81-84.

DLC GC851.G64

Climatology, Polar atmospheres, Atmospheric circulation, Gravity waves, Air temperature, Seasonal variations, Turbulent boundary layer, Turbulent exchange, Profiles, Sounding

51-4599

Snow surface energy exchanges and snowmelt at a continental, midlatitude alpine site.

Cline, D.W., *Water resources research*, Apr. 1997, 33(4), p.689-701, 27 refs.

Snow hydrology, Snowmelt, Mass balance, Snow heat flux, Surface energy, Heat balance, Snow air interface, Turbulent exchange, Sublimation, Microclimatology, Synoptic meteorology, Mathematical models

51-4600

ISCORD '97. Proceedings.

International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997, Zubeck, H.K., ed, Woolard, C.R., ed, White, D.M., ed, Vinson, T.S., ed, New York, American Society of Civil Engineers, 1997, 693p., Refs. passim. Printed with the assistance of the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL), Hanover, NH. For selected papers see 51-4601 through 51-4740.

Cold weather construction, Cold weather operation, Utilities, Buildings, Road maintenance, Land reclamation, Frost protection, Soil pollution, Soil stabilization, Permafrost preservation, Water pollution, Water treatment, Waste disposal, Pavements, Winter concreting

51-4601

Changes of cell wall composition and function of extensin in seedling leaf cell of wheat under cold stress.

Sun, J.Y., Zhao, Y.T., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.1-4, 7 refs.

Plants (botany), Plant tissues, Plant physiology, Plant ecology, Grasses, Acclimatization, Cold tolerance

51-4602

Potential for seed potato production in Tierra del Fuego Island, Argentina.

Caldiz, D.O., Caso, O.H., Vater, G., Fernández, L.V., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.5-8, 8 refs.

Introduced plants, Plant physiology, Plant ecology, Agriculture, Argentina—Tierra del Fuego

51-4603

Screening and studies of soybeans for cold tolerance. I. Relationship between physical characters, chemical composition, germination and cold tolerance in soybean.

Zhao, Y.T., Liang, B.W., Chang, R.Z., Li, Y.J., Sun, J.Y., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.9-12, 9 refs.

Plants (botany), Plant physiology, Plant tissues, Plant ecology, Acclimatization, Cold tolerance, Agriculture

51-4604

Research of moving winter wheat to the north's comprehensive technique.

Song, Y.H., Zhang, Y., Song, X.Y., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.21-24.

Introduced plants, Plant ecology, Grasses, Acclimatization, Cold tolerance, Agriculture, China

51-4605

Impact of climate change on north-western ecosystems of Russia.

Kobak, K.I., Kondrasheva, N.IU., Turchinovich, I.E., Monakhova, IU.B., Toropova, A.A., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.45-48, 7 refs.

Forest ecosystems, Forest tundra, Vegetation patterns, Plant ecology, Peat, Wetlands, Climatic changes, Global warming, Russia

51-4606

Establishment of salicaceae in wetlands of Patagonia (Santa Cruz Province, Argentina).

Peri, P.L., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.49-52, 6 refs.

Wetlands, Forestry, Forest ecosystems, Introduced plants, Trees (plants), Plant ecology, Revegetation, Vegetation patterns, Argentina—Patagonia

51-4607

Design methods for floating structures in cold regions.

Hayakawa, T., et al, International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.53-56.

Ports, Docks, Floating structures, Ice conditions, Ice control, Japan—Hokkaido

51-4608

Development of structures for Halley Station in Antarctica.

Blake, D.M., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.57-60, 4 refs.

Stations, Buildings, Modular construction, Supports, Portable shelters, Cold weather construction, Snowdrifts, Antarctica—Halley Station

Halley 5, the 5th station to be built on the Brunt Ice Shelf, Coats Land, has accommodation, laboratory, and workshop buildings erected on jackable platforms to overcome the effects of an annual snow accumulation of approximately 1.5 m. Halley 5 was begun in the summer 1988-1989 and was put into operation in winter 1992. It consists of 3 jackable platforms at the points of an equilateral triangle 300 m apart, service tunnels, and a relocatable ski-mounted garage. The jackable platforms house the Accommodation Building (ACB) with workshops and living quarters for 30 people, and two smaller laboratory buildings. The legs of the platforms can be jacked up at about 40 cm/day when necessary to allow the snow to drift beneath the buildings. Future structures are planned to be built above ground since they are more accessible and easier to modify than those buried under the snow. The success of the ski-mounted garage prompted the deployment of another 30-person, ski-mounted accommodation module during the 1994-95 season.

51-4609

Application of seismic isolation in cold regions.

Liu, H., Quimby, T.B., Reinhorn, A.M., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.61-64, 6 refs.

Earthquakes, Bridges, Foundations, Supports, Damping, Rubber, Low temperature tests, Cold stress, Cold weather performance

51-4610

Wind-induced vibration of the central building of Syowa Station in Antarctica.

Hannuki, T., Sano, M., Ayukawa, M., Ishizawa, K., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.65-68, 1 ref.

Stations, Buildings, Modular construction, Steel structures, Wind pressure, Damping, Cold weather construction, Antarctica—Showa Station

A new central building for living quarters and administration, consisting of three stories, was built from 1991 to 1993 at Showa Station. The first floor was elevated and smaller in area than the second floor to reduce snowdrifts around the building, but with the second story extending over the first story, the shape subjected the building to severe vibrations from the wind. In 1995, the building was reinforced with exterior steel trusses supporting each of the cantilever ends of the second floor, and wind-induced vibrations were effectively reduced.

51-4611

Integrating northern design concepts—Nesbett Courthouse, a case study.

Carlson, M.P., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.69-72.

Urban planning, Buildings, Human factors engineering, Cold weather construction, United States—Alaska—Anchorage

51-4612

Building concepts for sustainable building in cold regions.

Sarja, A., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.73-76, 5 refs.

Buildings, Regional planning, Environmental protection, Cold weather construction

51-4613

Preservation of suitable indoor air quality in northern climates.

Johnson, R., Seifert, R., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.77-80, 8 refs.

Buildings, Houses, Indoor climates, Climate control, Ventilation, Air pollution, Health, Cold weather construction

51-4614
Feasibility study on passive ventilation in airtight houses in cold regions.
Fukushima, A., Enai, M., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.81-84, 2 refs.
Houses, Indoor climates, Climate control, Ventilation, Cold weather construction, Japan—Hokkaido

51-4615
New Alaska Native Medical Center: a model for design of buildings in cold regions.
Klug, B.K., Edmonds, G.J., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.85-88.
Buildings, Regional planning, Human factors engineering, Cold weather construction, United States—Alaska—Anchorage

51-4616
Research on the characteristics of snowdrift in high-rise buildings in snowy areas.
Mitsuhashi, H., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.89-92, 3 refs.
Residential buildings, Snowdrifts, Blowing snow, Snow loads, Snow fences, Cold weather construction

51-4617
Improvement of frost resistance of antiwashout underwater concrete.
Ayuta, K., Andoh, T., Mizumoto, T., Nanaumi, T., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.93-94.
Concrete freezing, Concrete durability, Frost action, Frost resistance, Frost protection, Concrete admixtures, Air entrainment, Waterproofing

51-4618
Effect of antifreeze on the mechanical properties and interface microstructure of minus temperature concrete.
Ba, H.J., Yang, Y.Z., Liu, X.B., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.95-98, 3 refs.
Concrete freezing, Winter concreting, Concrete curing, Concrete admixtures, Concrete strength, Antifreezes, Frost protection, Microstructure

51-4619
Durability of concrete cured with antifreeze admixtures at temperatures below 0°C.
Wagner, D.J., Schroeder, H., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.99-102, 1 ref.
Concrete freezing, Winter concreting, Concrete curing, Concrete admixtures, Antifreezes, Frost protection, Concrete durability

51-4620
Experimental study on reuse of waste fresh concrete materials by adding special retarder in cold region.
Kagaya, M., Tokuda, H., Kawakami, M., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.103-106, 1 ref.
Winter concreting, Concrete curing, Concrete admixtures, Concrete retarders, Concrete strength

51-4621
Winter concreting in the middle Urals.
Biziaev, A.I., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.107-110, 1 ref.
Winter concreting, Concrete heating, Concrete strength, Russia—Ural Mountains

51-4622
Thermal response analysis of reinforced concrete frames subjected to repeated temperature changes.
Kushiyama, S., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.111-114, 2 refs.
Buildings, Concrete structures, Reinforced concretes, Concrete strength, Concrete durability, Thermal stresses, Thermal analysis, Structural analysis

51-4623
Research on durability of carbonation of minus temperature concrete with antifreeze.
Li, W.L., Zhao, X.L., Deng, H.W., Ba, H.J., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.115-118, 3 refs.
Winter concreting, Concrete freezing, Concrete durability, Concrete admixtures, Antifreezes, Frost protection

51-4624
Rocky Mountain dam construction.
Reichler, J.D., Smith, D.H., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.127-130.
Dams, Concrete structures, Winter concreting, Concrete placing, Concrete strength, Frost protection, Cold weather construction, Cost analysis, United States—Colorado

51-4625
Combining in-situ remedial technologies with natural attenuation; a remedial approach for a former tank farm in Alaska.
McGrath, R.W., Jones, M.A., Baker, J., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.135-137.
Oil storage, Storage tanks, Oil spills, Soil pollution, Ground water, Water pollution, Land reclamation, United States—Alaska—Kenai Peninsula

51-4626
Dredge removal of phosphorus-contaminated sediments at Eagle River Flats, Alaska.
Walsh, M.R., MP 4043, International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.139-142, 5 refs.
Military facilities, Estuaries, Wetlands, Soil pollution, Water pollution, Dredging, Waste disposal, Land reclamation, United States—Alaska—Fort Richardson

51-4627
Initial field results for rhizosphere treatment of contaminated soils in cold regions.
Reynolds, C.M., Koenen, B.A., Perry, L.B., Pidgeon, C.S., MP 4044, International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.143-146, 3 refs.
Oil spills, Soil pollution, Soil microbiology, Soil chemistry, Waste disposal, Land reclamation, Grasses, Roots, Revegetation, Protective vegetation, Plant physiology

51-4628
Bioremediation using fish bonemeal in cold climates.
Woolard, C.R., Walworth, J.L., Harris, K.C., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.147-150, 5 refs.
Oil spills, Soil pollution, Soil microbiology, Soil chemistry, Nutrient cycle, Waste disposal, Land reclamation

51-4629
Remediation of contaminated aquifers with magnesium peroxide.
Ferguson, A., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.151-154, 5 refs.
Oil spills, Soil pollution, Ground water, Water pollution, Soil microbiology, Soil chemistry, Aeration, Waste disposal, Land reclamation

51-4630
Environmental restoration activities at Kiska and Little Kiska Islands, Aleutian Islands, Alaska.
Salvino, J., Darigo, N., Beauchamp, S., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.155-158, 6 refs.
Military operation, Explosives, Soil pollution, Water pollution, Environmental impact, Site surveys, Land reclamation, United States—Alaska—Aleutian Islands

51-4631
Rapid qualification of air sparging for site remediation.
McKay, D.J., Baker, R.S., MP 4045, International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.163-166, 6 refs.
Soil pollution, Ground water, Water pollution, Soil surveys, Soil chemistry, Soil tests, Aeration, Waste disposal, Land reclamation

51-4632
Nitrous oxide as a nutrient source in bioventing.
Hogan, E.V., Willson, E.H., Woolard, C.R., Walworth, J.L., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.167-170, 4 refs.
Soil pollution, Soil microbiology, Soil chemistry, Nutrient cycle, Aeration, Waste disposal, Land reclamation

51-4633

Bioventing in subarctic regions: cold weather considerations and effects of glacial outwash plain geology.

Koch, F.E., Hinds, C., Machin, J.L., Rehage, J., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.171-174, 5 refs.

Outwash, Oil spills, Soil pollution, Soil microbiology, Soil chemistry, Nutrient cycle, Aeration, Frost protection, Waste disposal, Land reclamation, Cold weather operation

51-4634

Drilling waste disposal using large-diameter holes in permafrost, Prudhoe Bay, Alaska.

Hansen, P.G., Friar, W.L., Major, M.A., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.175-178.

Permafrost preservation, Tundra soils, Soil pollution, Drilling fluids, Artificial freezing, Waste disposal, Land reclamation, United States—Alaska—Prudhoe Bay

51-4635

Pond draining to treat white phosphorus-contaminated sediments at Eagle River Flats, Alaska.

Collins, C.M., MP 4046, International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.179-182, 4 refs.

Military facilities, Wetlands, Estuaries, Ponds, Bottom sediment, Explosives, Soil pollution, Water pollution, Drainage, Waste disposal, Land reclamation, United States—Alaska—Fort Richardson

51-4636

Cold climate corrosion control.

Perrigo, L.D., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.195-198, 6 refs.

Cold weather construction, Corrosion, Weatherproofing

51-4637

Impact of moisture in low sloped roofing on the structural serviceability of supporting steel deck.

Doshi, H., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.199-202, 4 refs.

Buildings, Steel structures, Roofs, Vapor barriers, Thermal insulation, Waterproofing, Weatherproofing, Cold weather construction

51-4638

Shipping and storage effects on corrosion performance.

Perrigo, L.D., III, International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.203-206, 8 refs.

Marine transportation, Logistics, Cargo, Storage, Corrosion, Weatherproofing, Waterproofing, Cold weather operation

51-4639

People and logistics in arctic corrosion control activities.

Dart, T.R., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.207-210, 5 refs.

Pipelines, Corrosion, Cold weather operation, Logistics, Safety, Health, Human factors, Labor factors, United States—Alaska

51-4640

Innovative concepts for the district heating of remote northern communities.

Desjardins, M., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.215-218.

Heat sources, Heat recovery, Heat transmission, Heating, Heat pipes, Water pipelines, Biomass, Fuels, Utilities

51-4641

Calculation and measurement of solar energy at an Alaskan site.

Das, D.K., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.219-223, 2 refs.

Electric power, Heat sources, Batteries, Solar radiation, Insolation, Mathematical models, United States—Alaska

51-4642

Alaskan multi-modal right-of-way corridors.

Odsather, R.L., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.245-248, 1 ref.

Transportation, Pipelines, Route surveys, Highway planning, Regional planning, Economic development, United States—Alaska

51-4643

Application of NASA's advanced life support technologies in polar regions.

Bubenheim, D.L., Flynn, M.T., Lewis, C.E., Okakok, R., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.249-252, 8 refs.

Water supply, Water treatment, Sewage disposal, Sanitary engineering, Utilities, Health, Human factors engineering

51-4644

Cold Regions Center of Expertise of the U.S. Army Corps of Engineers.

Smallidge, P.D., Hardy, D.L., MP 4047, International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.265-268.

Organizations, Research projects, Regional planning, Cold weather operation, Cold weather construction, Data processing, Data transmission

51-4645

Energy supply developments in Alberta.

Brown, T.D., Precht, P., Nelson, R., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.277-280.

Electric power, Crude oil, Fuels, Petroleum industry, Economic development, Regional planning, Cost analysis, Canada—Alberta

51-4646

Energy conservation analysis of a retrofitted residential building in cold region of China.

Xu, P., Yi, C., Sui, C.F., Zhao, L.H., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.281-284, 4 refs.

Residential buildings, Walls, Thermal insulation, Heating, Heat sources, Utilities, Fuels, Coal, Cold weather construction, Cost analysis, China

51-4647

Sustainable energy for the Arctic.

Isherwood, W.F., Rambach, G.D., Cooper, J.F., Berry, G.D., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.285-288.

Electric power, Fuels, Batteries, Utilities

51-4648

Electric power quality considerations for cold regions.

Aspnes, J., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.289-292, 6 refs.

Electric power, Utilities, Regional planning, Cost analysis, United States—Alaska

51-4649

Potential for significant wind energy utilisation at antarctic stations.

Guichard, A., Lyons, D., Magill, P., Godon, P., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.293-296, 5 refs.

Stations, Electric power, Wind power generation, Wind velocity, Wind pressure, Electric equipment, Utilities

A cooperative French-Australian project is evaluating the possibilities of, and developing plans for replacing diesel generators with wind power turbines at their antarctic stations. The turbines must be large enough to supply the necessary power requirements but small enough so their rotors will not be overstressed by the high winds. A promising machine is the Lagerwey LW18/80. Though smaller, the Vergnet GEV 7.10 has also shown some success. Wind turbines may not be able to supply 100% of the power needs of all stations and totally replace diesel generators, so some intermittent use of diesel generators may still be necessary. For now it is unrealistic to expect a wind turbine that could supply several hundred kW and also resist the highest wind speeds (90 m/s or 324 km/h measured at Dumont d'Urville Station), but wind-resistant, medium-sized wind turbines could meet a significant proportion of the power required by the stations.

51-4650

Changing basic climate elements for 1967-1994 in the northern regions of Russia.

Baĭkova, I.M., Efimova, N.A., Strokina, L.A., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.297-300, 2 refs.

Climatic changes, Meteorological data, Weather stations, Air temperature, Precipitation (meteorology), Snowfall, Cloud cover, Statistical analysis, Russia

51-4651

Classification method of winter weather environment.

Ito, T., Hasegawa, A., Hasegawa, T., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.301-304, 2 refs.

Snow cover distribution, Snowfall, Air temperature, Meteorological data, Weather forecasting, Urban planning, Regional planning, Statistical analysis, Japan

51-4652

Long-term variations in heating season duration and intensity in the northern regions of Russia.

Baĭkova, I.M., Efimova, N.A., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.305-308, 2 refs.

Buildings, Heating, Heat loss, Utilities, Regional planning, Cost analysis, Statistical analysis, Russia

51-4653

Deterioration of the cold region environments on the Qinghai-Tibet Plateau.

Jin, H.J., Wang, G.S., Cheng, G.D., Lin, Q., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.309-312, 10 refs.

Permafrost distribution, Permafrost thickness, Permafrost forecasting, Permafrost preservation, Ground thawing, Desiccation, Human factors, Climatic changes, Global warming, China—Qinghai-Xizang Plateau

51-4654

Addressing the impacts of global changes in the Arctic: the *Barents Sea Impact Study.*

Lange, M.A., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.313-316, 5 refs.

Polar atmospheres, Marine atmospheres, Atmospheric circulation, Global warming, Research projects, Computerized simulation, Barents Sea

51-4655

Environment and climate at high latitudes during the Late Glacial Holocene.

Borzenkova, I.I., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.321-324, 7 refs.

Forest tundra, Forest lines, Vegetation patterns, Paleobotany, Paleoclimatology, Global change

51-4656

Research on the damage to roadside snowbreak forests by snow hills in Hokkaido.

Abe, M., Hara, F., Saito, S., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.325-328, 3 refs.

Snowdrifts, Snow loads, Snow cover effect, Snow hedges, Forest strips, Protective vegetation, Plant ecology, Road maintenance, Japan—Hokkaido

51-4657

Geochemical distribution of trace metals in marine sediments from Beagle Channel, in Argentina.

Amin, O.A., Ferrer, L.D., Barral, A.O., Marcovecchio, J.E., Pucci, A.E., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.333-336, 9 refs.

Water pollution, Bottom sediment, Marine deposits, Soil pollution, Geochemistry, Argentina—Tierra del Fuego

51-4658

Use of macroalgae as bioindicator of heavy metal concentrations in coastal zone of Beagle Channel, Tierra del Fuego, Argentina.

Amin, O.A., Andrade, S., Ferrer, L.D., Comoglio, L.I., Marcovecchio, J.E., San Roman, N.A., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.337-340, 12 refs.

Water pollution, Bottom sediment, Marine deposits, Soil pollution, Geochemistry, Marine biology, Algae, Plant physiology, Argentina—Tierra del Fuego

51-4659

Ecosystem monitoring of a hydrothermal field area in Kamchatka.

Neshataeva, V.IU., Neshataev, V.IU., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.345-348, 6 refs.

Hot springs, Geothermal prospecting, Environmental impact, Plant ecology, Vegetation patterns, Russia—Kamchatka Peninsula

51-4660

Monitoring of fresh water flows in cold climate.

Arkharov, A.M., Arkharov, I.A., Glavatskikh, S.B., Grechko, A.G., Zherdev, A.A., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.349-352, 6 refs.

Water pipelines, Pipeline freezing, Pipe flow, Water flow, Ice formation indicators, Ice detection, Ice water interface, Monitors, Flow measurement, Flow control

51-4661

Groundwaters of the permafrost zone under conditions of man-made load.

Pinneker, E.V., Alekseev, S.V., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.353-355, 4 refs.

Permafrost beneath structures, Permafrost preservation, Permafrost hydrology, Subpermafrost ground water, Suprapermafrost ground water, Taliks, Water supply, Water pollution, Soil pollution

51-4662

Changes in the duration of snow cover period in the high latitudes.

Lemeshko, N.N., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.357-360, 8 refs.

Snow cover distribution, Snowfall, Snow melting, Snow air interface, Snow heat flux, Snow cover effect, Global warming, Runoff

51-4663

Supposed operation of the Chona oil pool and possible damage to fresh groundwater.

Shenkman, B.M., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.361-364.

Ground water, Subpermafrost ground water, Suprapermafrost ground water, Hydrogeology, Hydrogeochemistry, Soil pollution, Water pollution, Water reserves, Permafrost preservation, Environmental protection, Russia—Irkutsk

51-4664

Integrated studies of geomorphology, landscape ecology, and wildlife for environmental impact analysis of a proposed oil development project in arctic Alaska.

Jorgenson, M.T., Lawhead, B.E., Johnson, C.B., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.365-368, 2 refs.

Petroleum industry, Economic development, Land development, Deltas, Site surveys, Ecosystems, Environmental impact, United States—Alaska—Colville River Delta

51-4665

Cryogenesis of groundwaters of the Daldyn-Alakit Region (Western Yakutia).

Alekseev, S.V., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.369-372, 4 refs.

Ground water, Subpermafrost ground water, Suprapermafrost ground water, Permafrost hydrology, Frozen ground chemistry, Hydrogeochemistry, Saline soils, Paleoclimatology, Russia—Yakutia

51-4666

Project of the ecological atlas of the permafrost zone (Republic of Sakha/Yakutia).

Alekseev, V.R., Arkhipov, V.P., Kamenskiĭ, R.M., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.373-376.

Research projects, Maps, Permafrost surveys, Ecology, Human factors, Regional planning, Russia—Yakutia

51-4667

Thermal monitoring of a monolithic concrete slab cast on partly frozen soil.

Mobley, K.F., Vassar, R.J., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.377-380.

Buildings, Foundations, Concrete slabs, Winter concreting, Subgrade soils, Frozen ground temperature, Soil temperature, Frost protection, Thermal insulation, Cold weather construction, United States—Alaska—Anchorage

51-4668

Field determination of adfreeze frost heaving properties of structure.

Zhu, Q., Suzuki, T., Ogawa, S., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.381-384, 1 ref.

Concrete piles, Concrete slabs, Pile load tests, Soil freezing, Frost heave, Ground ice, Ice adhesion, Soil pressure, Frozen ground compression

51-4669

Summer construction of slurried steel pipe piles in warm permafrost.

Merrill, K.S., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.385-389, 2 refs.

Piles, Pile driving, Buildings, Foundations, Permafrost beneath structures, Permafrost preservation, Earth fills, Soil freezing, Artificial freezing, Soil stabilization, United States—Alaska—Selawik

51-4670

Special considerations for a thermopile foundation design Ft. Yukon School, Alaska.

Scher, R.L., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.391-394, 5 refs.

Buildings, Foundations, Thermopiles, Earth fills, Permafrost beneath structures, Permafrost preservation, Artificial freezing, Soil stabilization, United States—Alaska—Fort Yukon

51-4671

Two-dimensional finite element thermal modeling of an insulated highway embankment.

Hanneman, K.L., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.395-398, 2 refs.

Embankments, Subgrade soils, Soil stabilization, Frost protection, Thermal insulation, Permafrost beneath roads, Permafrost preservation, Subgrade maintenance, Road maintenance, United States—Alaska

51-4672

Rock fill embankment applications for convective foundation cooling on the BAM railway system.

Rooney, J.W., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.399-402, 7 refs.

Railroads, Embankments, Permafrost beneath roads, Permafrost preservation, Rock fills, Frost protection, Soil stabilization, Russia

51-4673

Environmental monitoring of the depth of frost penetration into landfill covers.

Moo-Young, H.K., Zimmie, T.F., Myers, T.J., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.403-406, 6 refs.

Waste disposal, Earth fills, Linings, Sludges, Frost resistance, Frost penetration, Frost protection

51-4674

Evaluation of frost penetration in landfill cover systems.

Zimmie, T.F., LaPlante, C.M., Quiroz, J.D., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.407-410, 5 refs.

Waste disposal, Earth fills, Linings, Sludges, Frost resistance, Frost penetration, Frost protection

51-4675

Determining protective frost thickness of pavement by mechanical calculation method.

Bing, W.S., Wang, J.M., Wang, X.L., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.411-414, 3 refs.

Pavements, Subgrade soils, Soil freezing, Frost heave, Frost penetration, Frost protection, Road maintenance, Mathematical models

51-4676

Macro-scale frost heave model.

Kim, J.R., Park, B.K., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.415-418, 6 refs.

Frost heave, Soil freezing, Soil water migration, Frost forecasting, Mathematical models

51-4677

Uses of flowable fill.

Lovell, W.C., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.421-424, 4 refs.

Waste disposal, Earth fills, Soil strength, Road maintenance, Cold weather performance

51-4678

Impact of near freezing soil temperatures on soil compaction.

Whelan, M.L., Stahl, S., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.425-428, 4 refs.

Soil compaction, Soil strength, Soil tests, Cold weather tests

51-4679

Performance of an insulated railroad track in interior Alaska.

Trueblood, T.B., Kinney, T.C., Kleinhans, D.D., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.419-432.

Railroads, Railroad tracks, Permafrost beneath roads, Permafrost preservation, Frost heave, Frozen ground settling, Settlement (structural), Frost protection, Thermal insulation, Soil stabilization, United States—Alaska

51-4680

Environmental engineering geology in cold regions of China.

Wang, G.S., Jin, J.J., Lin, Q., Cheng, G.D., Tong, C.J., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.433-436, 7 refs.

Highway planning, Cold weather construction, Engineering geology, Environmental impact, Environmental protection, Permafrost beneath roads, Permafrost preservation, China

51-4681

Re-examination of the seismic response of frozen-thawed soil systems.

Singh, S., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.437-440, 7 refs.

Earthquakes, Shock waves, Frost action, Frozen ground strength, United States—Alaska

51-4682

Discrete element modeling of the local interaction between a strip foundation and a frozen soil layer.

Sepehr, K., Selvadurai, A.P.S., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.445-448, 5 refs.

Foundations, Frozen ground strength, Frozen ground compression, Soil creep, Computerized simulation

51-4683

Estimation of the influence of sun-precipitation protective shed on the thermal regime of the roadbed base on permafrost.

Kondrat'ev, V.G., Liu, J.K., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.449-452, 6 refs.

Railroads, Roadbeds, Embankments, Permafrost beneath roads, Permafrost preservation, Soil stabilization, Shelters

51-4684

Monitoring pavements in cold regions with integrated methods.

Mactutis, J., Nazarian, S., Picornell, M., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.453-456.

Pavements, Subgrade soils, Freeze thaw tests, Frost resistance, Frozen ground strength, Road maintenance

51-4685

Steel reinforcement in asphalt pavements: laboratory tests and field experiences.

Nilsson, L.E., Johansson, S., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.457-460, 3 refs.

Pavements, Bituminous concretes, Reinforced concretes, Concrete strength, Concrete durability, Frost resistance, Frost protection, Road maintenance

51-4686

Overview of low temperature cracking of asphalt and polymer modified asphalt concrete pavements in Alaska.

Johnson, E., Raad, L., Sebaaly, P., Epps, J., Camilli, R., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.461-463, 3 refs.

Bituminous concretes, Concrete pavements, Cold weather performance, Low temperature tests, Frost resistance, Crack propagation, Road maintenance

51-4687

Sod peat as thermal insulation in road construction.

Suni, H., Kujala, K., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.465-468, 4 refs.

Subgrade soils, Earth fills, Peat, Thermal insulation, Frost protection, Subgrade maintenance, Road maintenance, Finland

51-4688

Reducing damage to low-volume roads by using lower tire pressures during spring thaw.

Kestler, M.A., MP 4048, International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.469-472, 7 refs.

Pavements, Thaw weakening, Tires, Highway planning, Road maintenance, Cold weather operation, Computerized simulation

51-4689
Parks Highway load restriction study.
Johnson, E., Barter, T., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.473-476, 7 refs.
Pavements, Thaw weakening, Thaw depth, Trafficability, Highway planning, Road maintenance, United States—Alaska

51-4690
Characteristics of crumb rubber modified (CRM) asphalt concrete at low temperature.
Kim, J.R., Park, B.K., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.477-480, 5 refs.
Bituminous concretes, Concrete pavements, Concrete admixtures, Trafficability, Low temperature tests, Cold weather performance, Road maintenance

51-4691
Polymer modified waterproofing and pavement system for the Höga Kusten bridge in Sweden.
Edwards, Y., Westergren, P., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.481-484, 8 refs.
Bridges, Concrete pavements, Bituminous concretes, Concrete admixtures, Polymers, Waterproofing, Frost protection, Sweden

51-4692
Joint sealants made of polymer bitumens; low temperature behavior.
Hean, S., Partl, M.N., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.485-488, 3 refs.
Concrete pavements, Bituminous concretes, Concrete admixtures, Polymers, Joints (junctions), Sealing, Frost protection, Waterproofing, Low temperature tests, Cold weather performance

51-4693
Chemistry of rime and snow at Mt. Zao, Yamagata Prefecture, Japan.
Yano, K., Yanagisawa, F., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.489-492, 6 refs.
Atmospheric circulation, Air pollution, Scavenging, Snow impurities, Snow composition, Glaze, Ice composition, Japan

51-4694
Digital thermometer for measuring temperature of ice.
Bogdanov, G.S., Kovalev, P.D., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.493-495, 1 ref.
Sea ice, Ice temperature, Temperature measurement

51-4695
Study on acidity of snow.
Hasegawa, T., Sato, S., Yamauchi, R., Ito, T., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.497-500, 1 ref.
Air pollution, Scavenging, Snow composition, Snow impurities, Snowmelt, Water chemistry, Water pollution, Japan

51-4696
Erosion control and reclamation of coastal sand areas on the Aleutian Islands of Alaska.
Wright, S.J., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.501-504, 6 refs.
Shores, Sands, Eolian soils, Wind erosion, Soil erosion, Soil conservation, Soil stabilization, Land reclamation, Revegetation, Protective vegetation, Grasses, United States—Alaska—Aleutian Islands

51-4697
Facilitating natural succession for mined land reclamation by use of on-site resources and amendments in Alaska.
Helm, D.J., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.505-508, 4 refs.
Mining, Soil erosion, Soil stabilization, Land reclamation, Revegetation, Protective vegetation, United States—Alaska

51-4698
Restoration of a coastal wetland following the rebuilding of a transmission line from Girdwood to Ingram Creek in southcentral Alaska.
Wright, S.J., Grooms, D.C., Steeby, D.D., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.509-512, 2 refs.
Power lines, Shores, Wetlands, Land reclamation, Revegetation, Protective vegetation, United States—Alaska

51-4699
Survival of northern latitude plant species in petroleum-contaminated soils.
Muniz, J.E., Walworth, J.L., Moore, N.J., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.513-516, 8 refs.
Oil spills, Soil pollution, Land reclamation, Revegetation, Plant physiology, Plant ecology

51-4700
Soil bioengineering techniques for riparian applications: materials and methods.
Moore, N.J., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.517-520, 2 refs.
Soil conservation, Soil stabilization, Land reclamation, Bank protection (waterways), Revegetation, Protective vegetation, Vegetation patterns, Plant ecology, United States—Alaska—Kenai Peninsula

51-4701
Revegetation in Alaska: where we have been and where we are heading.
Wright, S.J., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.521-524.
Soil conservation, Soil stabilization, Land reclamation, Revegetation, Protective vegetation, United States—Alaska

51-4702
Winter maintenance in Finland.
Leppänen, A., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.525-528, 2 refs.
Highway planning, Road icing, Road maintenance, Salting, Tires, Safety, Environmental impact, Cost analysis, Finland

51-4703
Ice debonding effects of asphalt mixture containing rubber particles.
Nishizawa, T., Murai, S., Kokubun, S., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.529-532, 3 refs.
Pavements, Bitumens, Rubber, Road icing, Ice solid interface, Ice adhesion, Ice prevention, Skid resistance, Road maintenance

51-4704
Runway 8/26 resurfacing, Ralph Wien Memorial Airport, Kotzebue, Alaska.
Rast, F., Scher, R.L., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.533-536, 7 refs.
Runways, Bituminous concretes, Concrete pavements, Thermal stresses, Frozen ground settling, Cracks, Road maintenance, United States—Alaska—Kotzebue

51-4705
Development of a vehicle underfloor snow-melting robot.
Imai, T., Fujii, T., Endo, T., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.537-540.
Railroad cars, Railroad equipment, Snow removal equipment, Snow melting, Artificial melting, Hydraulic jets

51-4706
Anti-snow-accumulation effect of artificial air flow blown over U-shaped structure.
Fujii, T., Imai, T., Endo, T., Kawashima, K., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.541-544.
Railroad cars, Railroad equipment, Snow removal equipment, Air flow

51-4707
Street sediment build-up rates in Anchorage, Alaska.
Wheaton, S.R., Brown, C., Gropp, E., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.545-548, 9 refs.
Streets, Municipal engineering, Sanitary engineering, Waste disposal, Water pollution, Road maintenance, United States—Alaska—Anchorage

51-4708
On deterioration of cement concrete exposed to de-icing agents.
Sasaki, K., Kaku, T., Inuzuka, M., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.549-552, 1 ref.
Concrete structures, Concrete strength, Concrete durability, Freeze thaw tests, Corrosion, Chemical ice prevention, Salting

51-4709
Experimental study on snow depth distribution on railway viaduct with side walls.
Imai, T., Fujii, T., Endo, T., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.553-556, 1 ref.
Railroads, Bridges, Concrete structures, Walls, Snowdrifts, Snow depth, Snow loads, Statistical analysis

51-4710
Winter of 1995/1996 geotechnical engineering experience.
Krzewinski, T.G., Lyytinen, K.A., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.557-560, 2 refs.
Concrete freezing, Concrete slabs, Concrete pavements, Foundations, Runways, Frost action, Accidents, Road maintenance, United States—Minnesota

51-4711
Winter pipeline construction in wetlands.
Barber-Wiltse, L.L., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.561-564, 5 refs.
Municipal engineering, Utilities, Water supply, Water pipelines, Pipe laying, Cold weather construction, Wetlands, Environmental protection, United States—Alaska—Anchorage

51-4712
Fire hydrant winter weather damage repair program for Anchorage, Alaska.
Piper, R.L., Bennett, R.W., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.565-568, 3 refs.
Municipal engineering, Utilities, Water pipes, Pipeline freezing, Frost action, Frost heave, Pipe laying, Cold weather operation, United States—Alaska—Anchorage

51-4713
Should I shovel my roof? Winter of '95-'96 roof failures in northern Minnesota.
Woodworth, J.R., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.569-572.
Buildings, Roofs, Accidents, Snowstorms, Snow loads, Snow removal, United States—Minnesota

51-4714
Drainage system failures in seasonally frozen environments.
Prusak, D.J., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.573-576, 3 refs.
Municipal engineering, Utilities, Drains, Drainage, Water pipes, Pipeline freezing, Frost action, Frost heave, Accidents, United States—Minnesota—Duluth

51-4715
Resources of icing formed groundwater and its spreading on northern part of Baikal region.
Alekseeva, L.P., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.577-580, 5 refs.
River basins, Permafrost hydrology, Subpermafrost ground water, Suprapermafrost ground water, Naleds, Water reserves, Russia—Baykal, Lake

51-4716
Studded tires the Finnish way.
Unhola, T., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.581-584.
Tires, Pavements, Hardness tests, Abrasion, Road maintenance, Cost analysis, Highway planning, Finland

51-4717
High quality aggregates for Norwegian highways.
Løberg, B.E., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.585-588.
Tires, Concrete aggregates, Pavements, Hardness tests, Abrasion, Highway planning, Road maintenance, Norway

51-4718
Characterization of pavement aggregates for studded tire resistance purposes.
Kavussi, A., Edgar, R.A., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.589-592, 5 refs.
Tires, Concrete aggregates, Bitumens, Pavements, Hardness tests, Abrasion, Highway planning, Road maintenance, United States—Oregon

51-4719
Use and effects of studded tires on Oregon pavements.
Brunette, B.E., Lundy, J.R., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.593-596, 7 refs.
Tires, Pavements, Hardness tests, Abrasion, Road maintenance, Highway planning, Cost analysis, United States—Oregon

51-4720
Wear resistance of bituminous mixes to studded tires—the Swedish experience.
Jacobson, T., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.597-600, 7 refs.
Tires, Bituminous concretes, Concrete pavements, Hardness tests, Abrasion, Road maintenance, Highway planning, Sweden

51-4721
Options for reducing stud-induced pavement wear.
Barter, T., Johnson, E., Sterley, D., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.601-604, 5 refs.
Tires, Bituminous concretes, Concrete pavements, Hardness tests, Abrasion, Cost analysis, Road maintenance, Highway planning, United States—Alaska

51-4722
Pavement wear from studded tyres—the Swedish solution.
Gustafson, K., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.605-608, 6 refs.
Tires, Bituminous concretes, Concrete pavements, Hardness tests, Abrasion, Road maintenance, Highway planning, Sweden

51-4723
Winter skidding accidents under studded-tire regulation.
Takagi, H., Tsutae, A., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.609-612.
Tires, Road icing, Skid resistance, Accidents, Safety, Legislation, Road maintenance, Highway planning, Japan—Hokkaido

51-4724
Winter tyres—socio-economic calculations.
Öberg, G., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.613-616, 2 refs.
Road icing, Tires, Skid resistance, Accidents, Safety, Cost analysis, Road maintenance, Highway planning, Sweden

51-4725
Winter tires, studs, safety and the environment.
Nilsson, H.F., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.617-620, 5 refs.
Road icing, Tires, Rubber ice friction, Rubber snow friction, Skid resistance, Traction, Safety, Road maintenance, Highway planning, Sweden

51-4726
Retractable anti-skidding device for automobiles.
Inuzuka, M., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.621-624, 1 ref.
Road icing, Tires, Vehicle wheels, Rubber ice friction, Skid resistance, Safety

51-4727
New test apparatus for estimation of friction in grease-lubricated rolling element bearings in cold conditions.
Lundberg, J., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.625-628, 3 refs.
Lubricants, Vehicle wheels, Cold weather performance, Low temperature tests

51-4728
Plough and stretch losses for rolling ball in grease.
Holgerson, M., Rieglert, J., Larsson, P.O., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.629-632, 7 refs.
Lubricants, Vehicle wheels, Cold weather performance, Low temperature tests

51-4729
Newly developed means of testing single-ply membranes during construction: the method and the industry.
Knight, K.D., Samuda, M.J., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.633-636, 3 refs.
Buildings, Ventilation, Air leakage, Weatherproofing, Vapor barriers, Cold weather construction, Cold weather tests

51-4730

Fluoridation of water reservoirs in Baffin Island, NT.

Rabbani-Farani, N., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.637-640, 4 refs.

Reservoirs, Ice water interface, Ice cover effect, Water supply, Water treatment, Water chemistry, Utilities, Canada—Northwest Territories—Baffin Island

51-4731

Starvation response in biological treatment systems.

Luetters, S.T., Woolard, C.R., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.641-644, 6 refs.

Water treatment, Sewage treatment, Waste treatment, Water chemistry, Microbiology, Bacteria, Nutrient cycle, Utilities

51-4732

Effects of temperature on sewage substrate degradation and sludge increment.

Li, Z.S., Liu, Y.Y., Wu, Z.C., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.645-648.

Sewage treatment, Water treatment, Water chemistry, Sludges, Microbiology, Nutrient cycle, Cold weather operation

51-4733

Controlled Ecological Life Support System Antarctic Analog Project: waste treatment technology development for use at the Amundsen-Scott South Pole Station.

Flynn, M.T., Bubenheim, D., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.649-652.

Stations, Utilities, Sanitary engineering, Sewage disposal, Waste disposal, Water treatment, Water chemistry, Water supply, Human factors engineering, Cold weather operation, Research projects, Antarctica—Amundsen-Scott Station

The Controlled Ecological Life Support System (CELSS) Antarctic Analog Project (CAAP) is a joint endeavor between the National Science Foundation, Office of Polar Programs (NSF-OPP) and the National Aeronautics and Space Administration (NASA). Its fundamental objective is to develop, deploy and operate a testbed of NASA Life Support technologies at the Amundsen-Scott South Pole Station. The CAAP program will attempt to provide in situ food and waste treatment facilities to winter-over personnel. Waste water is distilled. Solid wastes in the water provide nutrients for hydroponically grown vegetables. Water transpired from the vegetables provide potable water and the vegetables themselves provide food for the personnel. The CELSS may provide an analog for future space flights. (Auth.mod.)

51-4734

Effects of cold weather on composting.

Dean, J.R., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.653-655, 2 refs.

Waste disposal, Soil microbiology, Soil chemistry, Biomass, Nutrient cycle, Cold weather operation, United States—Alaska—Anchorage

51-4735

Sludge sled: a new device for removing sludge from lagoons.

Martel, C.J., MP 4049, International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.657-660, 1 ref.

Ponds, Dredging, Sludges, Sewage disposal, Waste disposal, Water treatment, Sanitary engineering, Cold weather operation

51-4736

Sequencing batch reactors for wastewater treatment in cold regions: a brief review.

White, D.M., Woolard, C.R., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.661-665, 13 refs.

Sewage disposal, Waste disposal, Water treatment, Sludges, Aeration, Utilities, Sanitary engineering, Cold weather operation

51-4737

Cold weather implementation of biological nutrient removal in wastewater treatment processes.

Berg, J., Vause, K., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.667-670.

Sewage disposal, Waste disposal, Water treatment, Water chemistry, Microbiology, Nutrient cycle, Utilities, Sanitary engineering, Cold weather operation, United States—Alaska—Prudhoe Bay

51-4738

Experiment and research on process flowsheet of municipal wastewater treatment plant in the cold regions.

Fu, H.J., Zheng, Q.Z., Peng, Y.Z., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.675-678.

Sewage treatment, Water treatment, Aeration, Water pollution, Water chemistry, Utilities, Municipal engineering, Sanitary engineering, China—Heilongjiang Province

51-4739

Orlon dyeing wastewater treatment by coagulation and air-flotation in the cold region.

Zheng, Q.Z., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.679-681.

Waste treatment, Sewage treatment, Water treatment, Water pollution, Water chemistry, Coagulation, Aeration, Cold weather operation

51-4740

Pilot study on air-flotation treatment of polluted water source with low temperature and low turbidity in cold region.

Zheng, Q.Z., Mi, Z.W., Fu, H.J., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.683-686.

Rivers, Water supply, Water pollution, Water chemistry, Waste treatment, Water treatment, Aeration, Cold weather operation, China—Heilongjiang Province

51-4741

Labs support Bosnia peacekeepers.

Stroupe, W., Poulson, P., Marquard, B., *Engineer update,* Mar. 1966, 20(3), p.6-7.

Military engineering, Cold weather operation, Bridges, Mines (ordnance), Rivers, Flooding, Snow removal equipment, Bosnia-Herzegovina, Sava River

51-4742

Shallow insulated foundation at Galena, Alaska: a case study.

Danyluk, L.S., SR 97-07, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Mar. 1997, 12p., ADA-325 471, 3 refs. For another source see 51-2667.

Foundations, Heat loss, Frost penetration, Thermal insulation, Isotherms, Design, Buildings, Footings, Frost protection, Cold weather construction, Military facilities, Building codes

A 2000-ft^2 addition to an aircraft control tower was constructed at Galena, AK, during the summer of 1990. Because of limited resources, a shallow insulated foundation (SIF) was specified instead of a traditional foundation (one in which the bottom of the footing is placed lower than the anticipated depth of frost penetration). An SIF design allows the footing to be placed at a much shallower depth by incorporating the use of strategically placed insulation around the foundation. The insulation utilizes heat from the building and surrounding soil, redirects it to the area around the foundation, and thus reduces the frost penetration.

51-4743

Effect of condensation on performance and design of extended surfaces.

Lunardini, V.J., Aziz, A., CR 95-20, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* Nov. 1995, 49p., ADA-302 744, Refs. p.45-49.

Heat transfer, Condensation, Design, Refrigeration, Dehumidification, Cold weather performance, Heat transfer coefficient, Mathematical models

Heat transfer surfaces operating in cold regions often involve condensation. The analytical and experimental progress made in understanding the process of condensation on extended surfaces (fins) is reviewed in detail. The review covers condensation of pure vapor as well as dehumidification of air. The analytical models discussed range from simple Nusselt-type analysis to the three-dimensional conjugate approach, in which the conservation equations for the condensate film are tightly coupled to conduction in the fin. A separate section discusses the topic of dehumidification of air on finned cooling coils. Other topics reviewed include condensation on horizontal integral-fin tubes, convective condensation in internally finned tubes, and condensation in micro-fin tubes. Although condensation on horizontal integral-fin tubes appears to be well understood, the understanding of convective condensation in internally finned tubes, particularly the micro-fin tubes, is very limited. Furthermore, there exists no established methodology for designing extended surfaces for condensation applications. This report contains several examples illustrating the theoretical results that provide some insight into the design process.

51-4744

Developing new low-temperature admixtures for concrete: a field evaluation.

Korhonen, C.J., Charest, B., Romisch, K., SR 97-09, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, 10p., ADA-325 475, 5 refs. For another source see 51-2665.

Concrete admixtures, Winter concreting, Cold weather construction, Freeze thaw cycles, Antifreezes, Concrete curing, Concrete strength, Concrete freezing, Concrete placing, Frost protection

Two new admixtures, capable of preventing water from freezing, as well as increasing the hydration rate of cement at below-freezing temperatures, were field tested at Sault Ste. Marie, MI. Concrete made with the admixtures was placed on a frozen subgrade during a cold winter day and was allowed to cure thermally, unprotected in the cold. Comparison to control concrete placed inside a heated shelter showed that the unprotected, admixtured concrete was equal to the control in strength and appearance. Work is continuing on the development of these admixtures for commercial use.

51-4745

Selection of confluence sites with ice problems for structural solutions.

Tuthill, A.M., Mamone, A.C., SR 97-04, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Mar. 1997, 23p., ADA-325 468, 21 refs.

River ice, Ice jams, Rivers, Channels (waterways), Locks (waterways), Lakes, Reservoirs, Flooding, Countermeasures, United States—Ohio River, United States—Illinois River, United States—Kankakee River, United States—Des Plaines River, United States—Missouri River, United States—Mississippi River, United States—Salmon River, United States—Connecticut River, United States—Aroostook River, United States—Chagrin River, United States—St. Clair River

This study examines a broad range of ice problems at river confluence sites, grouping the sites into four categories. Weighted criteria were used to select two representative sites from each category for detailed analysis. This report describes the ice problems at the eight

selected sites, focusing on the relationship between channel geometry, hydrometeorological factors, and the historical record of ice events. For each site, tentative structural solutions are proposed.

51-4746

Screening of 12 *Festuca* cultivars for rapid root development.

Palazzo, A.J., Brar, G.S., MP 4050, *Journal of turfgrass management,* 1997, 2(1), p.15-25, 27 refs.

Grasses, Plant physiology, Roots, Biomass

Establishment of cool season grass seedlings in sandy soils is difficult due to lack of sufficient water in the seed zone. The objective of this study was to quantify the root growth rate of two cultivars of each of six *Festuca* species in the greenhouse. *Festuca* cultivars differed in rooting depth, root elongation rates, root length density, root mass density, root area, shoot biomass, leaf area, leaf length, and leaf number. The deepest root system and greatest cumulative root elongation rates were observed for 'Clemfine' tall fescue (*Festuca arundinacea* Schreb.) Visible root depth within the tube wall was significantly correlated with the root length observed after soil washing. The results show that plants with aggressive root elongation rates had the deepest and best developed root and shoot systems.

51-4747

Field demonstration of on-site analytical methods for TNT and RDX in ground water.

Craig, H., et al, MP 4051, HSRC/WERC Joint Conference on the Environment, Albuquerque, New Mexico, 21-23 May 1996. Proceedings, Albuquerque, New Mexico, 1996, p.204-219, 19 refs.

Explosives, Ground water, Water pollution, Water treatment, Accuracy, Performance, Military operation

A field demonstration was conducted to assess the performance of eight commercially-available and emerging colorimetric, immunoassay, and biosensor on-site analytical methods for explosives 2,4,6-trinitrotoluene (TNT) and hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) in ground water and leachate at the Umatilla Army Depot Activity, Hermiston, OR and U.S. Naval Submarine Base, Bangor, WA, Superfund sites. Ground water samples were analyzed by each of the on-site methods and results compared to laboratory analysis using high performance liquid chromatography with EPA SW-846 Method 8330. The commercial methods evaluated include the EnSys, Inc., TNT and RDX colorimetric test kits (EPA SW-846 Methods 8515 and 8510) with a solid phase extraction step, the DTECH/EM Science TNT and RDX immunoassay test kits (EPA SW-846 Methods 4050 and 4051), and the Ohmicron TNT immunoassay test kit. The emerging methods tested include the antibody-based Naval Research Laboratory (NRL) Continuous Flow Immunosensor (CFI) for TNT and RDX, and the Fiber Optic Biosensor (FOB) for TNT. Accuracy of the on-site methods was evaluated using linear regression analysis and relative percent difference comparison criteria. Over the range of conditions tested, the colorimetric methods for TNT and RDX showed the highest accuracy of the commercially-available methods, and the NRL CFI showed the highest accuracy of the emerging methods for TNT and RDX. The colorimetric method was selected for routine ground water monitoring at the Umatilla site, and further field testing on the NRL CFI and FOB biosensors will continue at both Superfund sites. The primary use for these analytical methods would be for influent and effluent monitoring for granular activated carbon ground water and leachate treatment systems, which are projected to operate for a period of 10 to 30 years.

51-4748

Potential temperature behavior on Nansen Ice Sheet Antarctica, during year 1989.

Argentini, S., Del Buono, P., Grigioni, P., Della Vedova, A.M., *ENEA, Istituto di Fisica Atmosferica,* Dec. 1995, RT-AMB-95-20, 15p., DE97-713415, With Italian summary. 4 refs.

Ice sheets, Air temperature, Variations, Weather stations, Wind (meteorology), Wind velocity, Antarctica—Reeves Glacier, Antarctica—Priestley Glacier, Antarctica—Terra Nova Bay, Antarctica—Nansen Ice Sheet

The variability of the wind profile and atmospheric height and thermal structure in Terra Nova Bay were studied. The data collected by a network of Automatic Weather Stations (AWS) and by a sodar system during the summer '88-'89 are analyzed. To study the flow of Reeves and Priestley Glaciers and episodes in which the two flows are presented separately on the Nansen Ice Sheet, the difference of weekly mean potential temperature between the AWS 8909 and AWS 7352 for the year 1989—and the differences of daily mean potential temperature for all months—have been computed. Cases of anomalous stratification, in which the air masses from the Priestley Glacier are older than those of the Reeves Glacier, were found. To explain these superimpositions, sodar wind profiles and the potential temperatures of the AWSs 8909, 7352, 8931, and 8905 have been compared, hour by hour, for the 8th and 9th of Jan. During these hours, a katabatic wind episode is recorded. (Auth.)

51-4749

Distributed modeling of snowmelt and influence of wind.

Harelson, S., Johnson, L.E., International Conference on Water Resources Engineering, San Antonio, TX, Aug. 14-18, 1995. Proceedings, Vol.1. Edited by W.H. Espey, Jr. et al, New York, American Society of Civil Engineers, 1995, p.907-911, 3 refs.
DLC TC5.W38

Water supply, Watersheds, Snow surveys, Snow hydrology, Snowmelt, Heat transfer, Convection, Snow heat flux, Wind factors, Topographic effects, Models, Simulation, Runoff forecasting

51-4750

Research study on frazil ice control at a hydroelectric plant.

Tarbell, J.C., Cotroneo, G.V., Peterson, A., Murray, R., International Conference on Water Resources Engineering, San Antonio, TX, Aug. 14-18, 1995. Proceedings, Vol.2. Edited by W.H. Espey, Jr. et al, New York, American Society of Civil Engineers, 1995, p.1277-1281.
DLC TC5.W38

Electric power, Reservoirs, Hydraulic structures, Water intakes, River ice, Frazil ice, Ice control, Electric heating, Temperature control

51-4751

Scientific basis of precipitation enhancement.

Orville, H.D., International Conference on Water Resources Engineering, San Antonio, TX, Aug. 14-18, 1995. Proceedings, Vol.2. Edited by W.H. Espey, Jr. et al, New York, American Society of Civil Engineers, 1995, p.1784-1788.
DLC TC5.W38

Precipitation (meteorology), Weather modification, Cloud physics, Cloud seeding, Aerosols, Ice nuclei, Artificial nucleation, Heterogeneous nucleation, Ice crystal growth, Supercooling

51-4752

Ice accumulation rate and the geometry of ice jams in river bends.

Urroz, G.E., Ettema, R., National Conference on Hydraulic Engineering, Buffalo, NY, Aug. 1-5, 1994. Proceedings, Vol.1. Hydraulic engineering '94. Edited by G.V. Cotroneo et al, New York, American Society of Civil Engineers, 1994, p.386-390, 6 refs.
DLC TC5.H8

River ice, Ice jams, Ice formation, Sediment transport, Ice water interface, Channels (waterways), Unsteady flow, Fluid dynamics, Simulation, Ice cover thickness, Profiles

51-4753

Hydro plant research data acquisition system.

Donegan, J.E., Tarbell, J.C., Doyle, J.F., National Conference on Hydraulic Engineering, Buffalo, NY, Aug. 1-5, 1994. Proceedings, Vol.1. Hydraulic engineering '94. Edited by G.V. Cotroneo et al, New York, American Society of Civil Engineers, 1994, p.477-481.
DLC TC5.H8

Electric power, Reservoirs, Water intakes, Frazil ice, Ice formation, Ice control, Ice melting, Water temperature, Electric heating, Temperature control, Sensors, Photographic techniques, Computer applications

51-4754

Design and testing of two ice-preserving winter lake aeration systems.

Ellis, C.R., Stefan, H.G., National Conference on Hydraulic Engineering, Buffalo, NY, Aug. 1-5, 1994. Proceedings, Vol.2. Hydraulic engineering '94. Edited by G.V. Cotroneo et al, New York, American Society of Civil Engineers, 1994, p.1326-1330, 12 refs.
DLC TC5.H8

Lake ice, Ecology, Ice cover effect, Subglacial observations, Aeration, Bubbling, Ice control, Environmental protection, Design

51-4755

What is anti-icing.

U.S. Federal Highway Administration, U.S. Federal Highway Administration Test and Evaluation Project 28 "Anti-Icing Technology", Washington, D.C., [1996], n.p., 8-minute video cassette.
Road icing, Chemical ice prevention, Salting, Road maintenance

51-4756

Aircraft icing algorithms applied to U.S. Navy numerical model data: a verification study.

Vogel, G.N., *U.S. Naval Research Laboratory. Marine Meteorology Division. Report,* Feb. 1997, NRL/MR/7543—97-7228, 90p., ADA-324 028, 18 refs.
Aircraft icing, Ice forecasting, Weather forecasting, Computerized simulation, Statistical analysis

51-4757

Overview of environmental and hydrogeologic conditions at three Federal Aviation Administration facilities near Anchorage International Airport, Anchorage, Alaska.

Nakanishi, A.S., Graham, D.D., *U.S. Geological Survey. Open-file report,* 1995, No.94-712, 35p., 41 refs. Microfiche available from USGS.
Water supply, Water reserves, Hydrogeology, Hydrogeochemistry, Water chemistry, Water pollution, Soil pollution, Airports, United States—Alaska—Anchorage

51-4758

Overview of environmental and hydrogeologic conditions at Yakutat, Alaska.

Holmes, W.F., Dorava, J.M., *U.S. Geological Survey. Open-file report,* 1995, No.94-713, 17p., 29 refs. Microfiche available from USGS.
Water supply, Water reserves, Hydrogeology, Hydrogeochemistry, Water chemistry, Water pollution, Soil pollution, United States—Alaska—Yakutat

51-4759

Results of geophysical surveys of glacial deposits near a former waste-disposal site, Nashua, New Hampshire.

Ayotte, J.D., Dorgan, T.H., *U.S. Geological Survey. Open-file report,* 1995, No.95-142, 16p., 15 refs. Microfiche available from USGS.
Site surveys, Seismic surveys, Electromagnetic prospecting, Glacial deposits, Glacial till, Glacial lakes, Lacustrine deposits, Waste disposal, Soil pollution, Ground water, Water pollution, Land reclamation

51-4760

Overview of environmental and hydrogeologic conditions at Merrill Field Airport, Anchorage, Alaska.

Nakanishi, A.S., *U.S. Geological Survey. Open-file report,* 1995, No.95-171, 15p. + appends., 29 refs. Microfiche available from USGS.
Water supply, Water reserves, Hydrogeology, Hydrogeochemistry, Water chemistry, Water pollution, Soil pollution, Airports, United States—Alaska—Anchorage

51-4761

Environmental overview and hydrogeologic conditions at Federal Aviation Administration facilities near Fairbanks, Alaska.

Hawkins, D.B., *U.S. Geological Survey. Open-file report,* 1995, No.95-172, 11p., 19 refs. Microfiche available from USGS.
Water supply, Water reserves, Hydrogeology, Hydrogeochemistry, Water chemistry, Water pollution, Soil pollution, Airports, United States—Alaska—Fairbanks

51-4762

Overview of environmental and hydrogeologic conditions on Fire Island, Anchorage, Alaska.

Nakanishi, A.S., *U.S. Geological Survey. Open-file report,* 1995, No.95-174, 27p., 23 refs. Microfiche available from USGS.
Water supply, Water reserves, Hydrogeology, Hydrogeochemistry, Water chemistry, Water pollution, Soil pollution, Airports, United States—Alaska—Anchorage

51-4763

Hydrologic and water-quality data for the lower Bradley River, Alaska, March 1993 to April 1994.

Rickman, R.L., *U.S. Geological Survey. Open-file report,* 1995, No.95-338, 30p., 12 refs. Microfiche available from USGS.

River ice, Ice conditions, Ice cover effect, Ice control, Dams, Hydraulic structures, River flow, Flow control, Water chemistry, Environmental protection, United States—Alaska—Bradley River

51-4764

Volcanic activity in Alaska: summary of events and response of the Alaska Volcano Observatory 1992.

McGimsey, R.G., Neal, C.A., Doukas, M.P., *U.S. Geological Survey. Open-file report,* 1995, No.95-83, 26p., 15 refs. Microfiche available from USGS.

Volcanoes, Seismology, Avalanches, Mudflows, Floods, United States—Alaska

51-4765

1994 volcanic activity in Alaska: summary of events and response of the Alaska Volcano Observatory.

Neal, C.A., Doukas, M.P., McGimsey, R.G., *U.S. Geological Survey. Open-file report,* 1995, No.95-271, 18p., 8 refs. Microfiche available from USGS.

Volcanoes, Seismology, Avalanches, Mudflows, Floods, United States—Alaska

51-4766

Quick reference to Alaska's active volcanoes and listing of historical eruptions, 1760-1994.

McGimsey, R.G., Miller, T.P., *U.S. Geological Survey. Open-file report,* 1995, No.95-520, 13p., 9 refs. Microfiche available from USGS.

Volcanoes, Seismology, Avalanches, Mudflows, Floods, United States—Alaska

51-4767

Introduction to cold regions engineering.

Freitag, D.R., McFadden, T., New York, American Society of Civil Engineers, ASCE Press, 1997, 738p., Refs. passim.

DLC TA713.F735 1997

Frozen ground strength, Frozen ground thermodynamics, Ice cover strength, Ice loads, Permafrost beneath roads, Permafrost beneath structures, Buildings, Water supply, Sanitary engineering, Engineering geology, Cold weather construction, Cold weather performance

51-4768

Proceedings.

International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug. 26-30, 1996, Kulmala, M., ed, Wagner, P.E., ed, Oxford, Elsevier Science Ltd., 1996, 967p., Refs. passim. For selected papers see 51-4769 through 51-4804.

DLC QC921.6.C6 N83

Climatology, Cloud physics, Polar atmospheres, Air pollution, Aerosols, Stratosphere, Ice vapor interface, Ice formation, Heterogeneous nucleation, Homogeneous nucleation, Thermodynamics, Models, Statistical analysis, Environmental impact

51-4769

Role of particulate matter in ozone photochemistry (stratosphere and troposphere).

Crutzen, P.J., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.268-270, 5 refs.

DLC QC921.6.C6 N83

Climatology, Atmospheric composition, Stratosphere, Degradation, Cloud physics, Ozone, Aerosols, Heterogeneous nucleation, Ice formation, Ice vapor interface, Photochemical reactions

51-4770

Ice nucleation—a review.

Vali, G., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.271-279, Refs. p.277-279.

DLC QC921.6.C6 N83

Cloud physics, Ice formation, Polar stratospheric clouds, Ice nuclei, Freezing nuclei, Organic nuclei, Homogeneous nucleation, Nucleation rate, Ice vapor interface, Theories, Bacteria

51-4771

Formation mechanisms of polar stratospheric clouds.

Peter, T., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.280-291, Refs. p.289-291.

DLC QC921.6.C6 N83

Climatology, Polar stratospheric clouds, Cloud physics, Cloud droplets, Aerosols, Ozone, Degradation, Hydrates, Ice formation, Heterogeneous nucleation, Thermodynamics

This paper summarizes the current state of knowledge of the microphysics and heterogeneous chemistry of polar stratospheric clouds with emphasis on liquid and solid particle thermodynamics and on kinetics of non-reactive gas uptake leading to particle growth. The consequences of the present uncertainties for the chemical processing of stratospheric air are briefly discussed. (Auth. mod.)

51-4772

Aerosol production caused by civil air traffic: an overview of near-field interactions.

Kärcher, B., Luo, B.P., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.292-295, 9 refs.

DLC QC921.6.C6 N83

Atmospheric composition, Air pollution, Aerosols, Phase transformations, Chemical properties, Condensation trails, Heterogeneous nucleation, Freezing rate, Ice formation, Environmental impact

51-4773

Particle formation in jet aircraft exhausts and contrails for different sulfur containing fuels.

Schumann, U., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.296-299, 11 refs.

DLC QC921.6.C6 N83

Atmospheric composition, Air pollution, Aerosols, Condensation trails, Heterogeneous nucleation, Ice formation, Ice vapor interface, Fuel additives, Particle size distribution, Visibility

51-4774

Kinetics of homogeneous nucleation in large molecular clusters.

Bartell, L.S., Huang, J.F., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.308-311, 19 refs.

DLC QC921.6.C6 N83

Cloud physics, Supercooled clouds, Ice formation, Supercooled clouds, Water structure, Coalescence, Nucleation rate, Ice vapor interface, Homogeneous nucleation, Simulation, Scanning electron microscopy

51-4775

Laboratory studies of sulfate aerosols at low temperatures.

Onasch, T.B., Anthony, S.E., Tisdale, R.T., Prenni, A.J., Tolbert, M.A., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.312-314, 15 refs.

DLC QC921.6.C6 N83

Climatology, Polar stratospheric clouds, Cloud physics, Supercooled clouds, Aerosols, Condensation nuclei, Air pollution, Homogeneous nucleation, Spectroscopy, Simulation

51-4776

Crystallization kinetics of nitric acid dihydrate aerosols: implications for polar stratospheric clouds.

Tolbert, M.A., Disselkamp, R.S., Tisdale, R.T., Prenni, A.J., Onasch, T., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.315-317, 11 refs.

DLC QC921.6.C6 N83

Climatology, Polar atmospheres, Ozone, Polar stratospheric clouds, Supercooled clouds, Homogeneous nucleation, Ice formation, Ice vapor interface, Simulation, Thermodynamics, Spectroscopy

Type Ia polar stratospheric clouds are thought to consist of HNO_3/H_2O mixtures, usually assumed to be crystalline nitric acid trihydrate (NAT) or nitric acid dihydrate (NAD). The authors studied the crystallization of supercooled aerosols to determine the activation parameters used in homogeneous nucleation calculations. They found that the interfacial surface energy for NAD nucleation is much lower than the corresponding surface energy for NAT, suggesting a possible role for NAD in type Ia PSC formation. (Auth. mod.)

51-4777

Freezing of binary and ternary solutions of H_2SO_4, HNO_3 and H_2O under stratospheric conditions: nucleation statistics and experiments.

Koop, T., Luo, B.P., Biermann, U.M., Peter, T., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.318-321, 8 refs.

DLC QC921.6.C6 N83

Atmospheric composition, Polar stratospheric clouds, Cloud physics, Heterogeneous nucleation, Nucleation rate, Freezing points, Aerosols, Solutions, Simulation, Statistical analysis

New calorimetric freezing experiments of binary and ternary H_2SO_4/HNO_3/H_2O solutions are presented with applications to the formation of polar stratospheric clouds (PSCs). The authors show that the nucleation of hydrates from these solutions is a stochastic process and nucleation rates can be determined using Poisson statistics. The experiments reveal that under stratospheric conditions the freezing process of aerosol droplets is limited by the nucleation rates of the hydrates, rather than their crystal growth rates. Under thermodynamic equilibrium conditions above the ice frost point the homogeneous nucleation rates of stratospheric aerosols are exceedingly low, ruling out homogeneous freezing as a pathway for PSC formation. (Auth. mod.)

51-4778

Influence of adsorbed atomic and molecular ions electric field on ice phase formation in clouds.

Klingo, V.V., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.322-325, 3 refs.

DLC QC921.6.C6 N83

Cloud physics, Electric fields, Ice formation, Adsorption, Ice vapor interface, Phase transformations, Monomolecular films, Ion diffusion, Heterogeneous nucleation, Nucleation rate, Mathematical models

51-4779

Directed ice nuclei modification by variation of aerosol particles composition.

Malkina, A.D., Patrikeev, V.V., Kim, N.S., Shkodkin, A.V., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.326-329, 8 refs.

DLC QC921.6.C6 N83

Climatology, Weather modification, Cloud seeding, Heterogeneous nucleation, Ice formation, Aerosols, Freezing nuclei, Hygroscopic nuclei, Simulation, Chemical properties

51-4780

Study on the climate change of ice nuclei concentration in Beijing of 1963 to 1995.

You, L.G., Wang, X.G., Yang, S.Z., Pi, J.X., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.330-333, 5 refs.

DLC QC921.6.C6 N83

Climatology, Cloud physics, Ice nuclei, Condensation nuclei, Aerosols, Air pollution, Dust, Climatic changes, Cloud chambers, Simulation, Seasonal variations, China

51-4781

On vertical change of concentration of aerosol particles and ice nuclei in atmosphere.

Khorguani, V.G., Khvedelidze, Z.V., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.334-337, 3 refs.

DLC QC921.6.C6 N83

Climatology, Cloud physics, Aerosols, Atmospheric composition, Aerial surveys, Ice nuclei, Distribution, Profiles

51-4782

Study of effect of electrical charges and electrical fields on ice-forming activity of aerosols.

Adzhiev, A.Kh., Kalov, R.Kh., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.338-340, 7 refs.

DLC QC921.6.C6 N83

Cloud physics, Weather modification, Cloud seeding, Ice crystal growth, Heterogeneous nucleation, Aerosols, Supercooled clouds, Silver iodide, Ice dielectrics, Electric fields, Charge transfer

51-4783

Numerical simulation of a contrail.

Levkov, L., Boin, M., Kornblueh, L., Raschke, E., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.345-348, 4 refs.

DLC QC921.6.C6 N83

Climatology, Aerosols, Condensation trails, Ice formation, Ice nuclei, Phase transformations, Snow pellets, Humidity, Heterogeneous nucleation, Mathematical models

51-4784

Monte Carlo studies of water/ice adsorbed on model AgI: effects of lattice shift.

Hale, B.N., Dimattio, D.J., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.349-352, 13 refs.

DLC QC921.6.C6 N83

Cloud physics, Aerosols, Cloud seeding, Substrates, Silver iodide, Condensation nuclei, Heterogeneous nucleation, Ice formation, Adsorption, Thermodynamics, Statistical analysis

51-4785

Ice nucleation on sulfuric acid particles.

Ohtake, T., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.353-356, 16 refs.

DLC QC921.6.C6 N83

Ice physics, Cloud physics, Hygroscopic nuclei, Condensation nuclei, Aerosols, Freezing points, Ice crystal growth, Heterogeneous nucleation, Ice vapor interface, Humidity

Based on measurements of ice-nucleus concentration at Amundsen-Scott Station, below -30°C with precisely controlled humidities, hygroscopic particles were converted to ice crystals below sub-water saturation environment. Ice-crystal nucleation on sublimation nuclei has been ruled out in Fairbanks ice fog, and in diamond-dust crystals formed over polar zones. Hygroscopic aerosol particles have been identified as sulfuric acid, which are originated from ocean sources, manmade air pollution and volcanic activities. Sulfuric acid particles will form minute water droplets which freeze into ice crystals at the freezing temperatures that vary depending upon the aqueous sulfuric acid solution concentrations. These minute sulfuric acid particles must be responsible for formation on cirrus cloud crystals and even the polar stratospheric cloud particles. (Auth. mod.)

51-4786

Laboratory studies on evaporation ice nuclei.

Beard, K.V., Moore, R., Ochs, H.T., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.357-360, 29 refs.

DLC QC921.6.C6 N83

Cloud physics, Simulation, Cloud droplets, Ice nuclei, Ice sublimation, Evaporation, Ice vapor interface, Supercooled clouds, Electric charge

51-4787

Nucleation characteristics of polycrystalline ice crystals.

Kikuchi, K., Harada, M., Uyeda, H., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.361-364, 14 refs.

DLC QC921.6.C6 N83

Cloud physics, Polar atmospheres, Cloud chambers, Ice crystal structure, Classifications, Cloud seeding, Silver iodide, Heterogeneous nucleation, Microscope slides

Polycrystalline ice crystals which were microphotographed by the authors in arctic and antarctic regions were classified into 12 types. Almost all of them were crossed plates type and their production rate was approximately less than 5% of usual ice crystals. To investigate the shapes of these ice crystals and their production rate, laboratory experiments using a cloud chamber were carried out under temperature conditions between -18 and -42°C. As a result, almost all shapes that were observed in the polar regions occurred in the chamber and their rate was less than 5%, a value similar to that of an observational result. (Auth. mod.)

51-4788

Isolating and identifying atmospheric ice-nucleating aerosols: a new technique.

Chen, Y., Kreidenweis, S.M., Rogers, D.C., Demott, P.J., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.373-376, 2 refs.

DLC QC921.6.C6 N83

Cloud physics, Simulation, Cloud chambers, Aerosols, Silver iodide, Ice nuclei, Detection, Ice vapor interface, Thermal diffusion

51-4789

Intercomparing results of ice nuclei concentration measurements carried out simultaneously using cloud chamber and filter method.

Plaude, N.O., Potapov, E.I., Vychuzhanina, M.V., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.377-380, 2 refs.

DLC QC921.6.C6 N83

Cloud physics, Ice nuclei, Cloud chambers, Filters, Air pollution, Aerosols, Detection, Statistical analysis, Accuracy, Correlation

51-4790

Does electrostatic charge at cloud tops affect rates of nucleation and sedimentation of ice?

Tinsley, B.A., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.381-384, 23 refs.

DLC QC921.6.C6 N83

Cloud physics, Ice formation, Ice nuclei, Sedimentation, Nucleation rate, Aerosols, Atmospheric electricity, Electric charge, Cloud electrification, Static electricity

51-4791

Size-dependent stratospheric droplet composition in rapid temperature fluctuations.

Peter, T., Meilinger, S., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.385-388, 6 refs.

DLC QC921.6.C6 N83

Cloud physics, Polar stratospheric clouds, Gravity waves, Cloud droplets, Temperature variations, Cooling rate, Aerosols, Freezing nuclei, Heterogeneous nucleation, Hydrates, Ice vapor interface

51-4792

Numerical simulation of freezing of strong electrolyte solution.

Kuznetsova, E.M., Bogdan, M., Rontu, L., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.389-392, 10 refs.

DLC QC921.6.C6 N83

Cloud physics, Polar stratospheric clouds, Solutions, Simulation, Freezing points, Freezing nuclei, Heterogeneous nucleation, Aerosols, Dielectric properties, Ion exchange

51-4793

Time series of the condensation nuclei concentration at the German Neumayer-Station in Antarctica since 1982.

Jaenicke, R., Dreiling, V., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.435-438, 9 refs.

DLC QC921.6.C6 N83

Atmospheric composition, Air pollution, Condensation nuclei, Aerosols, Polar atmospheres, Atmospheric boundary layer, Statistical analysis, Seasonal variations, Antarctica—Georg von Neumayer Station

Since the antarctic summer 1981-82, measurements of the atmospheric condensation nuclei(CN) concentration have been performed at Georg von Neumayer Station. The data in Antarctica show a pronounced seasonality with the minimum in winter and a maximum in summer time. The new evaluation for the period 1990 to 1994 again shows an increase. (Auth. mod.)

51-4794

Short- and long range variations of dispersal and chemical composition of arctic aerosols.

Kuusk, V.V., et al, International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.546-549, 4 refs.

DLC QC921.6.C6 N83

Climatology, Polar atmospheres, Air pollution, Atmospheric composition, Chemical composition, Aerosols, Distribution, Particle size distribution, Statistical analysis, Sampling

51-4795

Thermodynamic properties of the NH_4^+/H+/SO_4^{-2}/ NO_3^-/Cl-/H_2O system under atmospheric conditions.

Luo, B.P., Peter, T., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.558-561, 6 refs.

DLC QC921.6.C6 N83

Atmospheric composition, Chemical properties, Aerosols, Liquid phases, Solid phases, Thermodynamic properties, Phase transformations, Solubility, Humidity

51-4796

Physical properties and sources of atmospheric aerosols in the Finnish Arctic.

Virkkula, A., Mäkinen, M., Hillamo, R.E., Kerminen, V.M., Stohl, A., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.593-596, 10 refs.

DLC QC921.6.C6 N83

Atmospheric composition, Polar atmospheres, Air pollution, Aerosols, Distribution, Condensation nuclei, Mass transfer, Statistical analysis, Finland

51-4797

Combustion gases and morphology of ice crystals: experimental studies under tropopausal conditions.

Singh, B., Singh, A., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.686-687, 3 refs.

DLC QC921.6.C6 N83

Air pollution, Condensation trails, Aerosols, Ice crystal structure, Ice formation, Heterogeneous nucleation, Simulation, Cold chambers, Ice vapor interface, Environmental tests

51-4798

CCN regulation of snowfall rates.

Borys, R.D., Lowenthal, D., Mitchell, D.L., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.808-811, 7 refs.

DLC QC921.6.C6 N83

Air pollution, Aerosols, Cloud physics, Condensation nuclei, Precipitation (meteorology), Snowfall, Snow crystal growth, Cloud droplets, Spectra, Forecasting

51-4799

Observations of column cloud liquid water in the atmosphere, some aerosols and gases near surface and snowfalls at the ground in Svalbard, Arctic.

Wada, M., Igarashi, M., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.812-815, 6 refs.

DLC QC921.6.C6 N83

Climatology, Polar atmospheres, Atmospheric boundary layer, Snow composition, Radio echo soundings, Aerosols, Snowfall, Water content, Chemical composition, Norway—Svalbard

51-4800

Long-term natural ice nuclei measurements.

Kim, N.S., Shkodkin, A.V., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.816-819, 3 refs.

DLC QC921.6.C6 N83

Atmospheric composition, Ice nuclei, Statistical analysis, Sampling, Filters, Aerosols, Air pollution

51-4801

On the variation of cloud condensation nuclei spectra at Palmer Station, Antarctica.

DeFelice, T.P., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.828-831, 17 refs.

DLC QC921.6.C6 N83

Climatology, Polar atmospheres, Atmospheric composition, Cloud physics, Sampling, Condensation nuclei, Spectra, Statistical analysis, Antarctica—Palmer Station

Cloud Condensation Nuclei (CCN) activity spectra and meteorological data were measured between Feb. 12 and Feb. 26, 1994 at Palmer Station. The CCN spectra were typical of a marine location. The meteorological and CCN spectral data indicate a significant change in the total CCN concentration measured in association with the sampling near the fog-free boundary of different air-masses or air-parcels, including those from evaporating clouds. These measurements show that the temporal variation of CCN spectra may be used to obtain information concerning air-mass transport and mixing without making the measurements within cloudy air. (Auth.)

51-4802

Potential impact of soot particles from aircraft exhaust on cirrus clouds.

Jensen, E.J., Toon, O.B., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.848-850, 7 refs.

DLC QC921.6.C6 N83

Climatology, Cloud physics, Air pollution, Condensation trails, Heterogeneous nucleation, Ice crystal growth, Ice nuclei, Condensation nuclei, Simulation, Statistical analysis

51-4803

Nucleation of ice particles in orographic cirrus: a numerical simulation of the microphysics.

Spice, A., Johnson, D.W., Saunders, C.P.R., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.852-855, 9 refs.

DLC QC921.6.C6 N83

Cloud physics, Condensation nuclei, Ice nuclei, Ice formation, Freezing, Heterogeneous nucleation, Mathematical models, Wind factors

51-4804

Studies of homogeneous and heterogeneous ice formation by aerosols in upper tropospheric cloud conditions.

Demott, P.J., Chen, Y., Rogers, D.C., Kreidenweis, S.M., International Conference on Nucleation and Atmospheric Aerosols, 14th, Helsinki, Finland, Aug.26-30, 1996. Proceedings. Edited by M. Kulmala et al, Oxford, Elsevier Science Ltd., 1996, p.876-879, 16 refs.

DLC QC921.6.C6 N83

Cloud physics, Aerosols, Ice formation, Humidity, Heterogeneous nucleation, Homogeneous nucleation, Condensation nuclei, Mathematical models

51-4805

Formation of ferric iron crusts in Quaternary sediments of Lake Baikal, Russia, and implications for paleoclimate.

Deike, R.G., Granina, L., Callender, E., McGee, J.J., *Marine geology,* June 1997, 139(1-4), p.21-46, Refs. p.44-46.

Limnology, Paleoclimatology, Lacustrine deposits, Quaternary deposits, Classifications, Sedimentation, Diagenesis, Geochemical cycles, Drill core analysis, Radioactive age determination, Rock magnetism, Russia—Baykal, Lake

51-4806

Seasonal variability in phosphorus speciation and deposition in a calcareous, eutrophic lake.

Penn, M.R., Auer, M.T., *Marine geology,* June 1997, 139(1-4), p.47-59, Refs. p.57-59.

Limnology, Lake water, Suspended sediments, Sedimentation, Lacustrine deposits, Geochemical cycles, Ice cover effect, Seasonal variations, Nutrient cycle, Sampling

51-4807

Phosphorus distribution, C:N:P ratios, and $\delta^{13}C_{oc}$ in arctic, temperate and tropical coastal sediments: tools for characterizing bulk sedimentary organic matter.

Ruttenberg, K.C., Goñi, M.A., *Marine geology,* June 1997, 139(1-4), p.123-145, Refs. p.142-145.

Shores, Marine geology, Arctic landscapes, Estuaries, Surface drainage, Deltas, Tundra soils, Suspended sediments, Carbon isotopes, Isotope analysis, Geochemistry, Canada—Northwest Territories—Mackenzie River

51-4808

Impact assessment of climate change on the hydrological response of a snow and glacier melt runoff dominated Himalayan river.

Singh, P., Kumar, N., *Journal of hydrology,* June 1997, 193(1-4), p.316-350, Refs. p.348-350.

Climatic changes, River basins, Global warming, Hydrologic cycle, Snow hydrology, Glacial hydrology, Glacier melting, Meltwater, Precipitation (meteorology), Hydrography, Snow water equivalent, Runoff forecasting, India—Himalaya Mountains

51-4809

Evolution of marginal zones during continued glacial retreat in northwestern Wedel Jarlsberg Land, Spitsbergen.

Reder, J., *Polish polar research,* 1996, 17(1-2), p.61-84, With Polish summary. Refs. p.81-83.

Geomorphology, Glacial geology, Glacial hydrology, Moraines, Glacier ablation, Glacier mass balance, Ice edge, Topographic maps, Landforms, Classifications, Norway—Spitsbergen

51-4810

Mountain soils derived from massive rocks in the northwestern Wedel Jarlsberg Land, Spitsbergen.

Klimowicz, Z., Melke, J., Uziak, S., *Polish polar research,* 1996, 17(1-2), p.85-92, With Polish summary. 14 refs.

Geological surveys, Arctic landscapes, Alpine landscapes, Mountain soils, Organic soils, Grain size, Soil profiles, Soil composition, Lithology, Rock properties, Norway—Spitsbergen

51-4811

Soil and vegetation conditions in small valleys at southern coast of Bellsund, Spitsbergen.

Klimowicz, Z., Uziak, S., *Polish polar research,* 1996, 17(1-2), p.93-106, With Polish summary. 29 refs.

Arctic landscapes, Tundra terrain, Tundra vegetation, Valleys, Plant ecology, Soil composition, Organic soils, Grain size, Chemical composition, Cryoturbation, Norway—Spitsbergen

51-4812

Ice-marginal sedimentation and its implications for ice-lobe deglaciation patterns in the Baltic region: Pohjankangas, western Finland.

Lunkka, J.P., Gibbard, P., *Journal of Quaternary science,* Sep.-Oct. 1996, 11(5), p.377-388, Refs. p.386-388.

Glacial geology, Glacier oscillation, Meltwater, Sedimentation, Moraines, Glacial deposits, Quaternary deposits, Geomorphology, Landforms, Stratigraphy, Models, Finland—Pohjankangas

51-4813

Late Wisconsin climate in northeastern USA and southeastern Canada, reconstructed from fossil beetle assemblages.

Elias, S.A., Anderson, K.H., Andrews, J.T., *Journal of Quaternary science,* Sep.-Oct. 1996, 11(5), p.417-421, 32 refs.

Paleoclimatology, Ice sheets, Ice edge, Air temperature, Seasonal variations, Paleoecology, Quaternary deposits, Radioactive age determination, Geochronology, Correlation, North America

51-4814

Application of a grouped response unit hydrological model to a northern wetland region.

Pietroniro, A., Prowse, T., Hamlin, L., Kouwen, N., Soulis, R., *Hydrological processes*, Oct. 1996, 10(10), p.1245-1261, 37 refs.

Wetlands, River basins, Discontinuous permafrost, Permafrost hydrology, Snow hydrology, Snowmelt, River flow, Runoff forecasting, Models

51-4815

Small-scale spatial structure of shallow snowcovers.

Shook, K., Gray, D.M., *Hydrological processes*, Oct. 1996, 10(10), p.1283-1292, 13 refs.

Snow cover structure, Snow depth, Distribution, Microstructure, Fractals, Sampling, Statistical analysis, Topographic effects, Snow stratigraphy

51-4816

Measurement of frost-induced snowmelt runoff in a forest soil.

Stadler, D., Wunderli, H., Auckenthaler, A., Flühler, H., Bründl, M., *Hydrological processes*, Oct. 1996, 10(10), p.1293-1304, 19 refs.

Snow hydrology, Snowmelt, Runoff, Water transport, Forest soils, Forest canopy, Interception, Seepage, Permeability, Frost penetration, Snow cover effect, Ice water interface

51-4817

Preferential water flow in a frozen soil—a two-domain model approach.

Stähli, M., Jansson, P.E., Lundin, L.C., *Hydrological processes*, Oct. 1996, 10(10), p.1305-1316, 26 refs.

Frozen ground mechanics, Hydrogeochemistry, Snow hydrology, Snowmelt, Water transport, Seepage, Frost penetration, Seasonal freeze thaw, Regelation, Hydraulics, Mathematical models

51-4818

Incorporating radiation inputs into the snowmelt runoff model.

Brubaker, K., Rango, A., Kustas, W., *Hydrological processes*, Oct. 1996, 10(10), p.1329-1343, 21 refs.

Snow hydrology, Snowmelt, Hydrography, Runoff forecasting, Degree days, Radiation balance, Snow surface temperature, Snow air interface, Snow cover distribution, Mathematical models, Simulation

51-4819

Some aspects of the interaction of blowing snow with the atmospheric boundary layer.

Déry, S.J., Taylor, P.A., *Hydrological processes*, Oct. 1996, 10(10), p.1345-1358, 40 refs.

Snow physics, Blowing snow, Atmospheric boundary layer, Turbulent boundary layer, Stratification, Snow air interface, Shear stress, Atmospheric density, Particle size distribution, Suspended sediments, Wind velocity, Mathematical models

51-4820

Test of the radiative energy balance of the SHAW model for snowcover.

Flerchinger, G.N., Baker, J.M., Spaans, E.J.A., *Hydrological processes*, Oct. 1996, 10(10), p.1359-1367, 30 refs.

Atmospheric boundary layer, Surface temperature, Radiation balance, Heat transfer, Snow cover effect, Snow air interface, Forest canopy, Albedo, Radiation absorption, Attenuation, Vegetation factors, Seasonal variations, Simulation, Mathematical models

51-4821

Development and validation of an isotopic method for estimating lake evaporation.

Gibson, J.J., Edwards, T.W.D., Prowse, T.D., *Hydrological processes*, Oct. 1996, 10(10), p.1369-1382, 41 refs.

Limnology, Arctic landscapes, Tundra terrain, Hydrologic cycle, Air water interactions, Evaporation, Mass balance, Oxygen isotopes, Isotope analysis, Seasonal variations, Accuracy

51-4822

Meltwater fluxes at an arctic forest-tundra site.

Marsh, P., Pomeroy, J.W., *Hydrological processes*, Oct. 1996, 10(10), p.1383-1400, 27 refs.

Forest tundra, Arctic landscapes, Surface energy, Heat balance, Snow hydrology, Snow cover effect, Snow air interface, Ice water interface, Seepage, Metamorphism (snow), Snowmelt, Meltwater, Advection, Mathematical models

51-4823

Velocity-discharge relationships derived from dye tracer experiments in glacial meltwaters: implications for subglacial flow conditions.

Nienow, P.W., Sharp, M., Willis, I.C., *Hydrological processes*, Oct. 1996, 10(10), p.1411-1426, 24 refs.

Glacial hydrology, Mountain glaciers, Glacier melting, Glacier tongues, Subglacial drainage, Ice water interface, Flow measurement, Velocity measurement, Diurnal variations, Seasonal variations, Statistical analysis

51-4824

Emission of N_2O from agricultural soil under snow cover: a significant part of N budget.

Van Bochove, E., Jones, H.G., Pelletier, F., Prévost, D., *Hydrological processes*, Nov. 1996, 10(11), p.1545-1549, 20 refs.

Soil physics, Agriculture, Carbon dioxide, Vapor transfer, Snow air interface, Snow cover effect, Snow hydrology, Mass transfer, Sampling, Loams, Greenhouse effect, Simulation

51-4825

Variability in the chemical composition of *in situ* subglacial meltwaters.

Tranter, M., et al, *Hydrological processes*, Jan. 1997, 11(1), p.59-77, 39 refs.

Glacial hydrology, Glacier tongues, Glacier melting, Meltwater, Classifications, Subglacial drainage, Runoff, Chemical composition, Electrical resistivity, Boreholes, Ice water interface, Hydrogeochemistry

51-4826

Long-term perspective on the nature of the air-water temperature relationship: a case study.

Webb, B.W., Nobilis, F., *Hydrological processes*, Feb. 1997, 11(2), p.137-147, Refs. p.146-147.

River basins, River flow, Snow hydrology, Snowmelt, Meltwater, Air water interactions, Air temperature, Freezing points, Water temperature, Seasonal variations, Forecasting, Latent heat, Statistical analysis

51-4827

Kinematic wave modelling of vertical movement of snowmelt water through a snowpack.

Singh, V.P., Bengtsson, L., Westerstrom, G., *Hydrological processes*, Feb. 1997, 11(2), p.149-167, 40 refs.

Snow hydrology, Snowmelt, Seepage, Saturation, Water flow, Wave propagation, Snow permeability, Ice water interface, Mathematical models, Boundary value problems, Runoff forecasting, Mathematical models

51-4828

Mid-winter stemflow drainage from bigtooth aspen (*Populus grandidentata* Michx.) in central Massachusetts.

Herwitz, S.R., Levia, D.F., Jr., *Hydrological processes*, Feb. 1997, 11(2), p.169-175, 41 refs.

Forest ecosystems, Forest soils, Hydrologic cycle, Winter, Albedo, Snow melting, Drainage, Glaze, Snow accumulation, Interception, Vegetation factors, Soil water, Nutrient cycle

51-4829

Kinematic wave modelling of saturated basal flow in a snowpack.

Singh, V.P., Bengtsson, L., Westerstrom, G., *Hydrological processes*, Feb. 1997, 11(2), p.177-187, 9 refs.

Snow hydrology, Snow physics, Snowmelt, Seepage, Hydrography, Subsurface drainage, Wave propagation, Velocity measurement, Runoff forecasting, Mathematical models, Statistical analysis, Ice water interface

51-4830

Use of borehole video in investigating the hydrology of a temperate glacier.

Copland, L., Harbor, J., Gordon, S., Sharp, M., *Hydrological processes*, Feb. 1997, 11(2), p.211-224, 39 refs.

Glacial hydrology, Subglacial drainage, Subglacial observations, Boreholes, Colored ice, Water level, Turbidity, Photographic techniques, Recording, Imaging, Structural analysis

51-4831

Warm future in the past.

Howard, W.R., *Nature*, July 31, 1997, 388(6641), p.418-419, 12 refs.

Climatic changes, Paleoclimatology, Sea level

The author provides a brief examination of discussions held at the symposium "Carbonate Marine System During Oxygen Isotope Stage 11," during the American Geophysical Union Spring Meeting, Baltimore, MD, USA, 27-30 May 1997. As to the questions are we entering an extended warming period or a short period of warmth followed by a return to glacial conditions, there appeared to be nearly equal amounts of evidence supporting each possibility.

51-4832

Predicted reduction in basal melt rates of an antarctic ice shelf in a warmer climate.

Nicholls, K.W., *Nature*, July 31, 1997, 388(6641), p.460-462, 16 refs.

Ice shelves, Ice melting, Ice salinity, Subglacial caves, Brines, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf

Presented here are temperature measurements, from the Filchner/Ronne sub-ice-shelf cavity, which show a strong seasonality in the inflow of HSSW. This seasonality results from intense wintertime production of sea ice, and it is argued that the seasonal springtime warming can be used as an analogue for climate warming. For the present mode of oceanographic circulation, the implication is that warmer winters (a climate warming) leading to lower rates of sea-ice formation, would cause a reduction in the flux of HSSW beneath the ice shelf. The resultant cooling in the sub-ice cavity would lead, in turn, to a reduction in the total melting at the ice shelf's base. A moderate warming of the climate could thus lead to a basal thickening of the Filchner-Ronne Ice Shelf, perhaps increasing its longevity. (Auth. mod.)

51-4833

Effects of sea-ice extent and krill or salp dominance on the antarctic food web.

Loeb, V., et al, *Nature*, June 26, 1997, 387(6636), p.897-900, 30 refs.

Sea ice distribution, Marine biology, Biomass, Antarctica—Antarctic Peninsula, Antarctica—Elephant Island

Krill *(Euphausia superba)* provide a direct link between primary producers and higher trophic levels in the antarctic marine food web. The pelagic tunicate *Salpa thompsoni* can also be important during spring and summer through the formation of extensive and dense blooms. Although salps are not a major dietary item for antarctic vertebrate predators, their blooms can affect adult krill reproduction and survival of krill larvae. Here the authors provide data from 1995 and 1996 that support hypothesized relationships between krill, salps and region-wide sea-ice conditions. They have assessed salp consumption as a proportion of net primary production, and found correlations between herbivore densities and integrated chlorophyll-*a* that indicate a degree of competition between krill and salps. Analysis of the relationship between annual sea-ice cover and a longer time series of air temperature measurements shows a decreased frequency of winters with extensive sea-ice development over the last five decades. Data suggest that decreased krill availability may affect the levels of their vertebrate predators. Regional warming and reduced krill abundance therefore affect the marine food web and krill resource management. (Auth. mod.)

51-4834

Three-dimensional modeling of two glaciers and deformation analysis of ice-rich permafrost. [Dreidimensionale Modellierung zweier Gletscher und Deformationsanalyse von eisreichem Permafrost]

Wagner, S., *Zürich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen*, 1996, No.146, 135p., In German with English summary. Refs. p.93-100.

Mountain glaciers, Rock glaciers, Glacier flow, Glacier beds, Basal sliding, Ground ice, Ice deformation, Ice creep, Soil creep, Computerized simulation

51-4835

Runoff formation under extreme precipitation: identification of runoff processes by artificial precipitation. [Abflussbildung bei Starkniederschlägen: Identifikation von Abflussprozessen mittels künstlicher Niederschläge]

Scherrer, S., *Zürich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen,* 1997, No.147, 188p., In German with English summary. Refs. p.153-158.

Precipitation (meteorology), Seepage, Ground water, Soil water migration, Slope processes, Stream flow, Runoff forecasting, Flood forecasting, Artificial precipitation, Environment simulation

51-4836

Numerical simulation of shockwaves in free surface flows. [Numerische Simulation von Stosswellen in Freispiegelströmungen]

Näf, D.R., *Zürich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen,* 1997, No.148, 175p., In German with English summary. Refs. p.131-137.

Dams, Spillways, Accidents, Floods, Flood forecasting, Flood control, Water flow, Hydrodynamics, Turbulent flow, Shock waves, Mathematical models, Computerized simulation

51-4837

Glacier fluctuations in the Alps. Meeting in honor of the retirement of Markus Aellen, February 28, 1996, in Zürich. [Gletscherschwankungen im Alpenraum. Tagung zum Altersrücktritt von Markus Aellen am 28 Februar 1996 in Zürich], *Zürich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen,* 1997, No.149, 84p., In German. Refs. passim. For selected papers see 51-4838 through 51-4844.

Glacier surveys, Mountain glaciers, Glacier oscillation, Glacier flow

51-4838

"Normal" and unusual glacier variations. ["Normale" und aussergewöhnliche Gletscherveränderungen]

Röthlisberger, H., *Zürich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen,* 1997, No.149, Gletscherschwankungen im Alpenraum. Tagung zum Altersrücktritt von Markus Aellen am 28 Februar 1996 in Zürich (Glacier fluctuations in the Alps. Meeting in honor of the retirement of Markus Aellen, Zürich, Feb. 28, 1996), p.11-27, In German. 17 refs.

Mountain glaciers, Glacier surveys, Glacier oscillation, Glacier tongues, Moraines, Switzerland

51-4839

Ice dynamics at the confluence of Aare glaciers. [Eisdynamik am Zusammenfluß der Aaregletscher]

Gudmundsson, G.H., *Zürich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen,* 1997, No.149, Gletscherschwankungen im Alpenraum. Tagung zum Altersrücktritt von Markus Aellen am 28 Februar 1996 in Zürich (Glacier fluctuations in the Alps. Meeting in honor of the retirement of Markus Aellen, Zürich, Feb. 28, 1996), p.29-38, In German. 20 refs.

Glacier surveys, Mountain glaciers, Glacier oscillation, Glacier flow, Ice deformation, Ice creep, Switzerland

51-4840

Spatial analysis and kinematics of glacier fluctuations. [Räumliche Analyse der Schwankungen von Gletschern und ihrer Kinematik]

Kääb, A., *Zürich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen,* 1997, No.149, Gletscherschwankungen im Alpenraum. Tagung zum Altersrücktritt von Markus Aellen am 28 Februar 1996 in Zürich (Glacier fluctuations in the Alps. Meeting in honor of the retirement of Markus Aellen, Zürich, Feb. 28, 1996), p.39-50, In German with English summary. 10 refs.

Glacier surveys, Mountain glaciers, Glacier oscillation, Glacier flow, Glacier surfaces, Glacier thickness, Photogrammetric surveys, Switzerland

51-4841

Sliding of a temperate valley glacier: a study on the Findelen Glacier. [Die Gleitbewegung eines temperierten Talgletschers: Eine Studie am Findelengletscher]

Truffer, M., Iken, A., *Zürich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen,* 1997, No.149, Gletscherschwankungen im Alpenraum. Tagung zum Altersrücktritt von Markus Aellen am 28 Februar 1996 in Zürich (Glacier fluctuations in the Alps. Meeting in honor of the retirement of Markus Aellen, Zürich, Feb. 28, 1996), p.51-59, In German. 8 refs.

Glacier surveys, Mountain glaciers, Glacier oscillation, Glacier flow, Basal sliding, Switzerland

51-4842

Snow cover and its time and spatial variation as a temporary water reserve. [Die Schneedecke in ihrer zeitlichen und räumlichen Variation als temporäre Wasserreserve]

Lang, H., Rohrer, M., Steinegger, U., *Zürich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen,* 1997, No.149, Gletscherschwankungen im Alpenraum. Tagung zum Altersrücktritt von Markus Aellen am 28 Februar 1996 in Zürich (Glacier fluctuations in the Alps. Meeting in honor of the retirement of Markus Aellen, Zürich, Feb. 28, 1996), p.61-67, In German with English summary. 5 refs.

Snow surveys, Snow cover distribution, Snow hydrology, Snow water equivalent, Water reserves, Switzerland

51-4843

Snow accumulation and ice flow at Dôme du Goûter (4300 m) on Mont Blanc. [Accumulations de neige et écoulement de la glace au Dôme du Goûter (4300 m) (Massif du Mont-Blanc)]

Vincent, C., Vallon, M., Pinglot, J.F., Funk, M., Reynaud, L., *Zürich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen,* 1997, No.149, Gletscherschwankungen im Alpenraum. Tagung zum Altersrücktritt von Markus Aellen am 28 Februar 1996 in Zürich (Glacier fluctuations in the Alps. Meeting in honor of the retirement of Markus Aellen, Zürich, Feb. 28, 1996), p.69-77, In French. 19 refs.

Glacier surveys, Mountain glaciers, Snow accumulation, Glacier alimentation, Glacier flow, Glacier oscillation, Glacier mass balance, Ice cores, Ice dating, France

51-4844

Italian contributions to the *Commission Internationale des Glaciers*.

Zanon, G., *Zürich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen,* 1997, No.149, Gletscherschwankungen im Alpenraum. Tagung zum Altersrücktritt von Markus Aellen am 28 Februar 1996 in Zürich (Glacier fluctuations in the Alps. Meeting in honor of the retirement of Markus Aellen, Zürich, Feb. 28, 1996), p.79-84, 23 refs.

Glacier surveys, Mountain glaciers, Glacier oscillation, Organizations, Research projects, International cooperation

51-4845

Understanding the processes of discharge formation under extreme precipitation: a study based on the numerical simulation of hillslope experiments.

Faeh, A.O., *Zürich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen,* 1997, No.150, 197p., With German summary. Refs. p.187-197.

Flood forecasting, Runoff forecasting, Precipitation (meteorology), Stream flow, River flow, Ground water, Seepage, Soil water migration, Mathematical models, Computerized simulation

51-4846

Sellafield leaves its mark on the frozen north.

Pearce, F., *New scientist,* May 10, 1997, 154(2081), p.14.

Radioactive wastes, Fallout, Waste disposal, Environmental impact, Water pollution, Air pollution

51-4848

Deep snow in British Columbia: survey implications for the National Building Code of Canada.

Taylor, D.A., *Canadian journal of civil engineering,* Apr. 1997, 24(2), p.169-179, With French summary. 8 refs.

Buildings, Roofs, Snow surveys, Snow loads, Snow density, Standards, Building codes, Design criteria, Canada—British Columbia

51-4849

Prediction of the spacing between thermal contraction cracks in asphalt pavement.

Konrad, J.M., Shen, M., *Canadian journal of civil engineering,* Apr. 1997, 24(2), p.288-302, With French summary. 23 refs.

Bituminous concretes, Pavement bases, Subgrades, Layers, Cold weather performance, Frost penetration, Freezing front, Stress concentration, Cracking (fracturing), Crack propagation, Mathematical models, Forecasting, Thermal analysis

51-4850

H_2O on Io? IR spectra of SO_2/H_2O mixed ices in the 5000-450 cm^{-1} region.

Dahmani, R., Khanna, R.K., *Astrophysics and space science,* Feb. 1996, 236(1), p.125-133, 18 refs.

Extraterrestrial ice, Satellites (natural), Regolith, Infrared radiation, Radiation absorption, Ice spectroscopy, Spectra, Temperature effects, Refractivity, Simulation

51-4851

Spatial and temporal patterns of iceberg rafting (IRD) along the East Greenland margin, ca. 68°N, over the last 14 cal.ka.

Andrews, J.T., Smith, L.M., Preston, R., Cooper, T., Jennings, A.E., *Journal of Quaternary science,* Jan.-Feb. 1997, 12(1), p.1-13, Refs. p.12-13.

Pleistocene, Glacial geology, Marine geology, Estuaries, Quaternary deposits, Marine deposits, Glacial deposits, Icebergs, Ice rafting, Drill core analysis, Lithology, Radioactive age determination, Greenland

51-4852

Relative and radiocarbon chronology of two former glaciers in the Chilean Lake District.

Bentley, M.J., *Journal of Quaternary science,* Jan.-Feb. 1997, 12(1), p.25-33, 11 refs.

Pleistocene, Paleoclimatology, Glacier oscillation, Mountain glaciers, Glacial geology, Quaternary deposits, Moraines, Topographic effects, Geomorphology, Landforms, Geochronology, Radioactive age determination, Chile—Lago Puyehue, Chile—Lago Rupanco

51-4853

Fluvial response to Weichselian climate changes in the Niederlausitz (Germany).

Mol, J., *Journal of Quaternary science,* Jan.-Feb. 1997, 12(1), p.43-60, Refs. p.58-60.

Geomorphology, Paleoclimatology, Climatic changes, Floodplains, Sedimentation, Landscape development, Lithology, Periglacial processes, Permafrost distribution, Stratigraphy, Geochronology, Vegetation factors, Germany—Niederlausitz

51-4854

Redepositional or climate event in Iberia during the Boreal.

Julià, R., Burjachs, F., Giralt, S., Allen, J.R.M., Huntley, B., Watts, W.A., *Journal of Quaternary science,* Jan.-Feb. 1997, 12(1), p.73-75, Includes reply. 8 refs. For pertinent paper see 51-3334.

Paleoclimatology, Paleoecology, Quaternary deposits, Palynology, Sedimentation, Geochronology, Correlation, Spain

51-4855

Bioenergetical description of selected tundra soils in Hornsund, Svalbard.

Fischer, Z., *Polish polar research,* 1995, 16(3-4), p.213-232, With Polish summary. 19 refs.

Arctic landscapes, Tundra soils, Tundra vegetation, Soil air interface, Soil microbiology, Soil tests, Soil classification, Ecosystems, Mosses, Lichens, Temperature effects, Norway—Svalbard

51-4856

Species diversity and distribution of Collembola in the vicinity of Polish Polar Station, Hornsund area, Spitsbergen.

Uvarov, A.V., Byzova, J.B., *Polish polar research,* 1995, 16(3-4), p.233-243, With Polish summary. 13 refs.

Arctic landscapes, Tundra soils, Tundra vegetation, Ecosystems, Soil microbiology, Biomass, Classifications, Sampling, Distribution, Statistical analysis, Norway—Spitsbergen

51-4857

Seasonal changes in communities of soil invertebrates in tundra ecosystems of Hornsund, Spitsbergen.

Byzova, J.B., Uvarov, A.V., Petrova, A.D., *Polish polar research,* 1995, 16(3-4), p.245-266, With Polish summary. 26 refs.

Soil microbiology, Arctic landscapes, Tundra soils, Patterned ground, Ecosystems, Biomass, Sampling, Classifications, Distribution, Seasonal variations, Norway—Spitsbergen

51-4858

Barriers of Pacific Alaska.

Hayes, M.O., Christopher, C.H., Geology of Holocene barrier island systems. Edited by R.A. Davis, Jr., Berlin, Springer-Verlag, 1994, p.395-433, 43 refs.

DLC GB471.G46

Marine geology, Shores, Beaches, Shoreline modification, Tectonics, Sediment transport, Classifications, Glacial geology, Glacial deposits, Deltas, Estuaries, Outwash, Geomorphology, United States—Alaska

51-4859

Results of investigation of the antarctic scene by SAR "ALMAZ-1" using interferometric processing.

Elizavetin, I.V., Ksenofontov, E.A., European Conference on Synthetic Aperture Radar, Königswinter, Germany, Mar. 26-28, 1996. Proceedings. EUSAR '96, Berlin, VDE-Verlag, 1996, p.257-260, 2 refs.

DLC TK6592.S95 E96

Ice sheets, Glacier flow, Ice shelves, Synthetic aperture radar, Spaceborne photography, Topographic surveys

This paper presents the advances in SAR interferometry using "Almaz-1" satellite data. Quality images were obtained on adjacent cycles for an antarctic coastal site with glacier tongue, grounded and sea ice fields and icebergs. The interferograms reveal glacier elevation and show the results of iceberg pressure on the ice sheets. Specific questions of interferometric processing are analyzed. The results of compensation for velocity vectors differences caused by nonsynchronous orbits are illustrated on phase pictures. (Auth. mod.)

51-4860

CLIMACS: a medium/low resolution SAR for global monitoring of land surfaces and sea ice.

Regolo, C., Lin, C.C., Mancini, P., European Conference on Synthetic Aperture Radar, Königswinter, Germany, Mar. 26-28, 1996. Proceedings. EUSAR '96, Berlin, VDE-Verlag, 1996, p.305-308, 5 refs.

DLC TK6592.S95 E96

Climatology, Remote sensing, Geophysical surveys, Synthetic aperture radar, Spaceborne photography, Sea ice distribution, Ice surveys, Radiometry, Resolution, Models

51-4861

Use of interferometric side looking radars for detection of hummocks and icebergs.

Blinkov, A., European Conference on Synthetic Aperture Radar, Königswinter, Germany, Mar. 26-28, 1996. Proceedings. EUSAR '96, Berlin, VDE-Verlag, 1996, p.573-575, 5 refs.

DLC TK6592.S95 E96

Sea ice, Surface structure, Remote sensing, Spaceborne photography, Side looking radar, Ice detection, Icebergs, Pressure ridges, Backscattering

51-4862

Topographic modeling of habitat suitability in the alpine tundra ecosystem: an integrated geographic information systems approach.

McGregor, S.J., Chapel Hill, University of North Carolina at Chapel Hill, 1995, 200p., University Microfilms order No.AADAA-I9605143, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B., 1996, p.5396.

Ecosystems, Geophysical surveys, Landscape types, Alpine tundra, Tundra terrain, Tundra vegetation, Vegetation patterns

51-4863

Ice loading effects in sedimentary basins with reference to the Barents Sea.

Lerche, I., Yu, Z., Tørudbakken, B., Thomsen, R.O., *Marine and petroleum geology,* May 1997, 14(3), p.277-338, 14 refs.

Marine geology, Hydrocarbons, Natural gas, Migration, Isostasy, Ocean bottom, Permeability, Soil pressure, Sea ice, Ice loads, Ice cover effect, Sedimentation, Simulation, Pleistocene, Barents Sea

51-4864

Performance of concrete sidewalks: field studies.

Rajani, B., Zhan, C., *Canadian journal of civil engineering,* Apr. 1997, 24(2), p.303-312, With French summary. 8 refs.

Sidewalks, Concrete slabs, Damage, Soil creep, Plastic deformation, Cracking (fracturing), Frost action, Frost penetration, Municipal engineering

51-4865

Winter streamflow variability in two groundwater-fed sub-arctic rivers, Yukon Territory, Canada.

Hamilton, A.S., Moore, R.D., *Canadian journal of civil engineering,* Dec. 1996, 23(6), p.1249-1259, With French summary. 27 refs.

River flow, Reservoirs, River ice, Freezeup, Ground water, Water storage, Hydrography, Winter, Snowmelt, Models, Canada—Yukon Territory

51-4866

Characteristic effects of a network of air bubbles, types of pumping, surface trawling and silica fume on the scaling resistance of high-performance concrete. [Les effets des caractéristiques du réseau de bulles d'air, du type de mûrissement, du truellage de surface et de la fumée de silice sur la résistance à l'écaillage d'un béton à haute performance]

Gagné, R., Latreille, Y., Marchand, J., *Canadian journal of civil engineering,* Dec. 1996, 23(6), p.1260-1271, In French with English summary. 24 refs.

Concrete durability, Air entrainment, Freeze thaw cycles, Frost resistance, Concrete curing, Concrete retarders, Mechanical properties, Bubbles, Degradation, Standards, Mechanical tests

51-4867

On the freezing time of cylinders and spheres.

Frolov, S.V., *Journal of engineering physics and thermophysics,* Oct. 1997, 70(2), p.309-314, Translated from Inzhenerno-Fizicheskiĭ zhurnal. 3 refs.

Cryogenics, Frozen liquids, Solids, Spheres, Freezing points, Stefan problem, Analysis (mathematics), Heat flux

51-4868

Measurement of the velocity of crystallization and melting by means of a pressure relaxation process.

Gans, W., Zimmermann, E., Kipp, S., Lacmann, R., *Journal of crystal growth,* June 1997, 177(3-4), p.275-280, 16 refs.

Ice physics, Phase transformations, Ice water interface, Ice melting, Ice crystal growth, Velocity measurement, Atmospheric pressure, Temperature effects, Thermostats

51-4869

Wastewater treatment wetlands in cold climates.

Wittgren, H.B., Mæhlum, T., *Water science & technology,* 1997, 35(5), International Conference on Wetland Systems for Water Pollution Control, 5th, Vienna, Austria, Sep. 15-19, 1996. Selected proceedings, p.45-53, 33 refs.

Wetlands, Water treatment, Waste treatment, Ice formation, Snowmelt, Ice cover effect, Insulation, Environmental impact, Environmental protection, Cold weather operation, Design criteria

51-4870

Orientational ordering of two-dimensional ice on Pt(111).

Glebov, A., Graham, A.P., Menzel, A., Toennies, J.P., *Journal of chemical physics,* June 8, 1997, 106(22), p.9382-9385, 21 refs.

Ice physics, Ice microstructure, Deuterium oxide ice, Ice structure, Layers, Molecular structure, Orientation, Adsorption, Ice solid interface, X ray diffraction

51-4873

Validation of the surface energy balance over the antarctic ice sheets in the U.K. Meteorological Office Unified Climate Model.

King, J.C., Connolley, W.M., *Journal of climate,* June 1997, 10(6), p.1273-1287, 41 refs.

Climatology, Insolation, Atmospheric boundary layer, Surface energy, Radiation balance, Snow heat flux, Ice air interface, Mathematical models, Wind factors

Surface radiation measurements and other climatological data were used to validate the representation of the surface energy balance over the East Antarctic Ice Sheet. Model calculations of incident and reflected shortwave radiation are in good agreement with observations, but the downward component of longwave radiation at the surface appears to be underestimated by up to 20 W/m^2 in the model. Over much of the interior of Antarctica this error appears to be compensated for by an overestimate in turbulent transport of heat to the surface, while over the steep coastal slopes the heat flux is in good agreement with observations but the surface temperature is too low. The excessive heat flux over the interior results largely from the use of an inappropriately large bulk transfer coefficient under very stable conditions, suggesting that the surface heat flux scheme in the model is not ideally formulated for the conditions that prevail in the antarctic boundary layer. (Auth. mod.)

51-4874

Analysis and modeling of the natural variability of climate.

Pelletier, J.D., *Journal of climate,* June 1997, 10(6), p.1331-1342, 55 refs.

Climatology, Climatic changes, Air temperature, Temperature variations, Sounding, Heat transfer, Ice cores, Ice composition, Correlation, Spectra, Mathematical models, Thermal diffusion

51-4875

Climatic and hydrologic changes in the Tien Shan, central Asia.

Aizen, V.B., Aizen, E.M., Melack, J.M., Dozier, J., *Journal of climate,* June 1997, 10(6), p.1393-1404, 45 refs.

Climatology, Precipitation (meteorology), Climatic changes, River basins, Hydrologic cycle, Mountain glaciers, Glacier mass balance, Snow depth, Runoff, Statistical analysis, Seasonal variations, Tian Shan

51-4876

Properties of the arctic 2-meter air temperature field for 1979 to the present derived from a new gridded dataset.

Martin, S., Munoz, E.A., *Journal of climate*, June 1997, 10(6), p.1428-1440, 24 refs.

Climatology, Marine atmospheres, Polar atmospheres, Air temperature, Surface temperature, Meteorological data, Temperature measurement, Sea ice distribution, Seasonal freeze thaw, Models, Correlation, Arctic Ocean

51-4877

NASA looks for water on the Moon.

Hecht, J., *New scientist*, Dec. 7, 1996, 152(2059), p.15.

Satellites (natural), Extraterrestrial ice, Ground ice, Ice detection, Water supply, Remote sensing, Electromagnetic prospecting

51-4878

Biodiversity and ecophysiology of bacteria associated with Antarctic sea ice.

Bowman, J.P., Brown, M.V., Nichols, D.S., *Antarctic science*, June 1997, 9(2), p.134-142, 29 refs.

Sea ice, Algae, Bacteria, Biomass, Antarctica—Prydz Bay

A total of 135 bacterial strains were isolated from congelation sea ice samples and ice algae biomass samples obtained from the coastal areas of the Vestfold Hills during the summers of 1992-95. The sea ice isolates, along with reference strains, were analyzed by numerical taxonomy and for DNA base composition in order to determine the biodiversity of sea ice bacteria. From these analyses 22 clusters of strains (phena) were obtained with most phena apparently representing novel bacterial taxa. The sea ice isolates could be categorized into three groups based on their ecophysiology: slightly halophilic, psychrophilic bacteria often possessing fastidious growth requirements; halotolerant and psychrotolerant bacteria; and nonhalophilic bacteria isolated primarily from upper sections of congelation ice and other ice samples with low levels of algal biomass. (Auth. mod.)

51-4879

Observations on "cryoplanation" benches in Antarctica.

Hall, K., *Antarctic science*, June 1997, 9(2), p.181-187, Refs. p.186-187.

Altiplanation, Bench marks, Freeze thaw cycles, Thermal stresses, Patterned ground, Permafrost, Antarctica—Alexander Island

A series of benches on nunataks of Alexander I. are described. An increase in bench size with distance away from the retreating glacier suggests an age spectrum. The benches have thermal contraction cracks (in bedrock) on shallower, upper sections of the risers as well as salt encrusted runnels on the steeper lower section of the tread. The benches also show a distinct orientational preference (oriented to the north through to west) and, from first principles, these seem to be the aspects with optimal freeze-thaw cycles and temperatures conducive to thermal stress fatigue. The extensive dilatation associated with the retreating glaciers is thought to play a significant role in the origin and development of the benches as the combination of extensive jointing, and optimal process conditions are thought to constrain where benches begin. The jointing, aided by the thermal contraction cracking, then facilitates extension and continued weathering of the treads. (Auth. mod.)

51-4880

Early winter ice and snow thickness distribution, ice structure and development of the western Ross Sea pack ice between the ice edge and the Ross Ice Shelf.

Jeffries, M.O., Adolphs, U., *Antarctic science*, June 1997, 9(2), p.188-200, Refs. p.199-200.

Sea ice distribution, Ice cover thickness, Snow depth, Ice structure, Ice formation, Pack ice, Antarctica—Ross Sea

A study of early winter first-year sea ice conditions and development in the western Ross Sea in May and June 1995, showed strong spatial variability between the Ross Ice Shelf and the ice edge 1400 km to the north, and indicates that the development of the Ross Sea pack ice is quite different from that observed in other antarctic sea ice zones. The thinnest snow and ice occurred in a 200 km wide coastal zone. The thickest snow and ice were observed in a continental shelf zone 200-600 km from the coast. A zone of moderate snow and ice thickness occurred on the deep ocean from 600 km to the ice edge at 1400 km. Thermodynamic thickening of the ice in the inner pack ice, <800 km from the coast, was dominated by congelation ice growth, which occurred in a greater amount and in thicker layers than was observed in the outer pack ice >800 km from the coast and elsewhere in the antarctic pack ice. (Auth. mod.)

51-4881

Seabed topography under the southern and western Ronne Ice Shelf, derived from seismic surveys.

Johnson, M.R., Smith, A.M., *Antarctic science*, June 1997, 9(2), p.201-208, Refs. p.207-208.

Seismic surveys, Ice shelves, Bottom topography, Ice water interface, Ocean currents, Thickness, Mapping, Antarctica—Ronne Ice Shelf

Seismic reflection measurements of ice thickness and water-column thickness have been made over the southern and western Ronne Ice Shelf, from which the seabed elevation has been determined. A 2300 km traverse, covering an area over which little bathymetric data previously existed and at a station interval of 15 km, resulted in 152 new measurements of the seabed elevation. With the addition of the new data there is now complete coverage of the seabed elevation and water-column thickness for Ronne Ice Shelf at a spatial resolution of between 10-100 km. The seabed in the area to the south of Korff and Henry ice rises and the Doake Ice Rumples is about 100 m shallower than had previously been speculated, which will affect the validity of previous assumptions of water circulation and ice-ocean interaction in this area. (Auth. mod.)

51-4882

Phase behavior of binary mixture of heptaethylene glycol decyl ether and water: formation of phase compound in solid phase.

Nibu, Y., Suemori, T., Inoue, T., *Journal of colloid and interface science*, July 1, 1997, 191(1), p.256-263, 25 refs.

Surfactants, Hydrates, Ice formation, Colloids, Frozen liquids, Phase transformations, Solid phases, Temperature measurement, Infrared spectroscopy, Spectra

51-4883

Aging of porous media following fluid invasion, freezing, and thawing.

Salmon, E., Ausloos, M., Vandewalle, N., *Physical review E*, June 1997, 55(6-A), p.R6348-R6351, 12 refs.

Porous materials, Fluid dynamics, Latticed structures, Freezing, Phase transformations, Water transport, Seepage, Damage, Freeze thaw cycles, Fractals, Statistical analysis, Models

51-4884

Effects of $Ca(OH)_2$ additions on phytoplankton communities under ice cover in eutrophic hardwater lakes.

Zhang, Y., Reedyk, S., Prepas, E.E., *Archiv für Hydrobiologie*, Apr. 1997, 139(3), p.235-253, Refs. p.251-253.

Limnology, Water treatment, Biomass, Plankton, Lake ice, Ice cover effect, Snow cover effect, Subglacial observations, Chlorophylls, Nutrient cycle, Sampling, Seasonal variations, Statistical analysis

51-4885

Hydrogen peroxide: a natural tracer of stratification and mixing processes in subarctic lakes.

Scully, N.M., Vincent, W.F., *Archiv für Hydrobiologie*, Mar. 1997, 139(1), p.1-15, 29 refs.

Limnology, Ultraviolet radiation, Photometry, Radiance, Water chemistry, Photochemical reactions, Water temperature, Stratification, Turbulent diffusion, Diurnal variations

51-4886

Ecological characteristics of a high mountain lake-outlet stream (Tatra Mts, Poland).

Kownacki, A., Dumnicka, E., Galas, J., Kawecka, B., Wojtan, K., *Archiv für Hydrobiologie*, Mar. 1997, 139(1), p.113-128, Refs. p.126-128.

Limnology, Stream flow, Ecosystems, Ecology, Seasonal freeze thaw, Algae, Biomass, Chlorophylls, Nutrient cycle, Classifications, Hydrogeochemistry, Seasonal variations, Poland—Tatra Mountains

51-4887

Stable isotopes as indicators of carbon flows and trophic structure of the benthic food web in a subarctic lake.

Gu, B.H., Alexander, V., Schell, D.M., *Archiv für Hydrobiologie*, Jan. 1997, 138(3), p.329-344, 40 refs.

Limnology, Littoral zone, Geochemistry, Lacustrine deposits, Biomass, Ecology, Algae, Nutrient cycle, Carbon isotopes, Isotope analysis, Statistical analysis

51-4888

Modelling climate, topography and palaeoglacier fluctuations in the Chilean Andes.

Hubbard, A.L., *Earth surface processes and landforms*, Jan. 1997, 22(1), p.79-92, 41 refs.

Geomorphology, Glacial geology, Climatic factors, River basins, Glacier flow, Glacier oscillation, Ice edge, Profiles, Glacier mass balance, Topographic effects, Models, Chile—Andes

51-4889

Climatic instability, ice sheets and ocean dynamics at high northern latitudes during the last glacial period (58-10 ka BP).

Rasmussen, T.L., van Weering, T.C.E., Labeyrie, L., *Quaternary science reviews*, 1997, Vol.16, p.71-80, 73 refs.

Paleoclimatology, Climatic changes, Paleoecology, Glacier oscillation, Meltwater, Salinity, Ocean currents, Icebergs, Bottom sediment, Drill core analysis, Isotope analysis, Remanent magnetism, Radioactive age determination

51-4890

Relationship between drumlins and other forms of subglacial glaciotectonic deformation.

Hart, J.K., *Quaternary science reviews*, 1997, Vol.16, p.93-107, 56 refs.

Glacial geology, Tectonics, Landforms, Glacier beds, Glacial erosion, Deformation, Sedimentation, Structural analysis, Classifications, Quaternary deposits, Subglacial observations

51-4891

Glaciotectonized Quaternary sediments at Dinas Dinlle, Gwynedd, North Wales, and their bearing on the style of deglaciation in the eastern Irish Sea.

Harris, C., Williams, G., Brabham, P., Eaton, G., McCarroll, D., *Quaternary science reviews*, 1997, Vol.16, p.109-127, 42 refs.

Marine geology, Glacial geology, Quaternary deposits, Tectonics, Ice push, Ice pressure, Seismic reflection, Stratigraphy, Deformation, Sedimentation, United Kingdom—Wales

51-4892

Using wavelets to detect trends.

Andreas, E.L., Treviño, G., MP 4052, *Journal of atmospheric and oceanic technology*, June 1997, 14(3)pt.1, p.555-564, 26 refs.

Climatology, Air temperature, Wind velocity, Periodic variations, Oscillations, Spectra, Statistical analysis, Mathematical models, Detection, Correlation

Wavelets are a new class of basis functions that are finding wide use for analyzing and interpreting time series data. This paper describes a new use for wavelets—identifying trends in time series. The general signal considered has a quadratic trend. The inverted Haar wavelet and the elephant wavelet, respectively, provide estimates of the first-order and second-order coefficients in the trend polynomial. This paper demonstrates wavelet trend detection using artificial data and then various turbulence data collected in the atmospheric surface layer, and last, provides guidelines on when linear and quadratic trends are "significant" enough to require removal from a time series. Anemometer data from Weddell Station, Antarctica is used in the analysis. (Auth. mod.)

51-4893

Future sustainable water use: challenges and constraints.

Kuylenstierna, J.L., Björklund, G., Najlis, P., *Journal of soil and water conservation*, May-June 1997, 52(3), p.151-156, 13 refs.

Water supply, Hydrologic cycle, Global change, Economic development, Natural resources, Ice (water storage), Environmental protection, Human factors

51-4894

Introduction to freeze fracture and deep etching.

Shotton, D.M., Severs, N.J., Rapid freezing, freeze fracture, and deep etching. Edited by N.J. Severs and D.M Shotton, New York, Wiley-Liss, Inc., 1995, p.1-30, Refs. p.28-30.

DLC QH236.2.R36

Cryobiology, Cryogenics, Laboratory techniques, Frozen liquids, Replicas, Microstructure, Fracturing, Freeze drying, Ice sublimation, Scanning electron microscopy, Microscope slides, Imaging

51-4895

Practical introduction to rapid freezing techniques.

Severs, N.J., Newman, T.M., Shotton, D.M., Rapid freezing, freeze fracture, and deep etching. Edited by N.J. Severs and D.M Shotton, New York, Wiley-Liss, Inc., 1995, p.31-49, Refs. p.47-49.

DLC QH236.2.R36

Cryobiology, Cryogenics, Frozen liquids, Laboratory techniques, Replicas, Freezing, Fracturing, Microstructure, Preserving

51-4896

High pressure freezing.

Kiss, J.Z., Staehelin, L.A., Rapid freezing, freeze fracture, and deep etching. Edited by N.J. Severs and D.M Shotton, New York, Wiley-Liss, Inc., 1995, p.89-104, Refs. p.101-104.

DLC QH236.2.R36

Cryobiology, Cryogenics, Frozen liquids, Laboratory techniques, Microscope slides, Replicas, Scanning electron microscopy, Ice prevention, Liquefied gases, Hydraulic jets

51-4897

Living snowfence: friend or foe.

Perko, D.J., United States Department of Agriculture. Forest Service. General technical report RM-GTR-261 and Agroforestry and sustainable systems: symposium proceedings. Fort Collins, CO, Aug. 7-10, 1994, Washington, D.C., 1995, p.43-46, 5 refs.

DLC S494.5.A45 A355

Blowing snow, Snowdrifts, Countermeasures, Snow fences, Topographic effects, Forest lines, Protective vegetation, Design

51-4898

Frost resistance of bricks and tiles: a review.

Butterworth, B., *Building Research Station, Garston, Watford, Hertfordshire, England. Building research current papers. Research series,* 1964, No.31, 14p., 78 refs.

Bricks, Ceramics, Frost resistance, Freeze thaw tests, Cold weather performance

51-4899

Measurement of the thermal diffusivities of some single-layer walls in buildings.

Pratt, A.W., Lacy, R.E., *Building Research Station, Garston, Watford, Hertfordshire, England. Building research current papers. Research series,* 1966, No.64, p.345-353, With French, German, and Russian summaries. 11 refs. Reprinted from International journal of heat and mass transfer, Vol.9, No.4, 1966.

Buildings, Walls, Heat flux, Heat transfer, Thermal conductivity, Mathematical models

51-4900

Laboratory freezing test for natural building stone.

Honeyborne, D.B., *Building Research Station, Garston, Watford, Hertfordshire, England. Building research miscellaneous papers,* 1965, No.3, 4p. + append., 3 refs.

Buildings, Masonry, Frost resistance, Freeze thaw tests, Cold weather construction

51-4901

International comparison of building regulations—thermal insulation.

Cibula, E., *Building Research Station, Garston, Watford, Hertfordshire, England. Current papers,* 1970, No.33/70, 32p., 6 refs.

Buildings, Thermal insulation, Building codes

51-4902

Thermal deformations and stresses in rectangular sandwich panels with non-rigid cores.

Pogorzelski, J., *Building science,* 1969, Vol.4, p.79-92, With French and German summaries. 5 refs.

Buildings, Walls, Panels, Thermal stresses, Structural analysis, Mathematical models

51-4903

On-site analytical methods for explosives in soils.

Crockett, A.B., Craig, H.D., Jenkins, T.F., MP 4053, *American environmental laboratory,* May 1997, p.27-30, 29 refs.

Military facilities, Explosives, Waste disposal, Soil pollution, Soil chemistry, Soil analysis, Chemical analysis

51-4904

New aircraft anti-icing guidelines ratified. *Transport Canada. Safety and Security. Transportation Development Centre. R&D update,* May 1997, 7(2), 1p., TP 10913.

Aircraft icing, Chemical ice prevention, Safety, Standards

51-4905

Roof ice-dam research: problems and solutions.

Ruest, K., Parekh, A., Conference on Building Science and Technology, Toronto, Ontario, Mar. 20-21, 1997. Proceedings. Durability of buildings—design, maintenance, codes, and practices, Montreal, Canadian Society for Civil Engineering, 1997, p.138-151, 6 refs.

Buildings, Roofs, Snow loads, Snow melting, Ice formation, Ice accretion, Ice loads, Icicles, Ice prevention, Ventilation, Thermal insulation, Cold weather construction

51-4906

Glaciers of Prince William Sound and the southern part of the Kenai Peninsula, Alaska. I. Glaciers of the northern part of Prince William Sound.

Grant, U.S., Higgins, D.F., *American Geographical Society. Bulletin,* 1910, 42(10), p.721-738.

Glacier surveys, Alpine glaciation, Glacial geology, Glacier oscillation, United States—Alaska—Prince William Sound

51-4907

People and the Arctic: a prospectus for research on the Human Dimensions of the Arctic System (HARC).

Arctic Research Consortium of the United States (ARCUS), Fairbanks, AK, 1997, 75p., Refs. p.61-67. For the U.S. National Science Foundation Arctic System Science (ARCSS) Program.

Research projects, Regional planning, International cooperation, Human factors, Environmental impact, Environmental protection, Global warming

51-4908

Crustal structure in Alaska.

Berg, E., *Tectonophysics,* 1973, Vol.20, p.165-182, 23 refs.

Earth crust, Tectonics, Geophysical surveys, Seismic surveys, Seismology, Earthquakes, Nuclear explosions, Elastic waves, Shock waves, Seismic velocity, United States—Alaska

51-4909

Heat storage in soft clay: field tests with heating (70°C) and freezing of the soil.

Gabrielsson, A., Lehtmets, M., Moritz, L., Bergdahl, U., *Swedish Geotechnical Institute (Statens Geotekniska Institut). SGI report,* 1997, No.53, 128p., 30 refs.

Clay soils, Soil freezing, Frozen ground thermodynamics, Freeze thaw cycles, Heat sinks, Heat recovery, Heat transfer, Heat sources, Utilities

51-4910

Dependence of the structure of the gas hydrate framework on the parameters of guest-host interactions for Lennard-Jones guests.

Kosiakov, V.I., Shestakov, V.A., *Journal of structural chemistry,* Mar. 1997, 37(5), p.780-785, Translated from Zhurnal strukturnoi khimii. 20 refs.

Hydrates, Clathrates, Natural gas, Gas inclusions, Phase transformations, Ice vapor interface, Molecular energy levels, Thermodynamics

51-4911

Glasgow's drumlins.

Menzies, J., *Scottish geographical magazine,* Nov. 1996, 112(3), p.188-193, 28 refs.

Glacial geology, Pleistocene, Geomorphology, Glacial deposits, Quaternary deposits, Landforms, Glacier flow, Landscape development, United Kingdom—Scotland

51-4912

Glacial sedimentological research in Scotland.

Benn, D.I., *Scottish geographical magazine,* Mar. 1996, 112(1), p.57-61, Refs. p.60-61.

Glacial geology, Quaternary deposits, Sediment transport, Glacial deposits, Moraines, Ice solid interface, Research projects, United Kingdom—Scotland

51-4913

Contour ripping: a tillage strategy to improve water infiltration into frozen soil.

Pikul, J.L., Jr., Wilkins, D.E., Aase, J.K., Zuzel, J.F., *Journal of soil and water conservation,* Jan.-Feb. 1997, 51(1), p.76-83, 23 refs.

Agriculture, Loams, Frozen ground mechanics, Runoff, Soil erosion, Soil conservation, Snowmelt, Snow retention, Water storage, Seepage, Topographic effects

51-4914

Effective tension-shear relationships in extensional fissure swarms, axial rift zone of northeastern Iceland.

Angelier, J., Bergerat, F., Dauteuil, O., Villemin, T., *Journal of structural geology,* May 1997, 19(5), p.673-685, 33 refs.

Tectonics, Geodetic surveys, Subarctic landscapes, Earth crust, Fracturing, Shear stress, Deformation, Magma, Fluid dynamics, Iceland

51-4915

Temporal and spatial distribution of BN28 during low temperature acclimation of *Brassica napus* cv. Cascade seedlings.

de Beus, M.D., Boothe, J.G., Johnson-Flanagan, A.M., *Canadian journal of botany,* Jan. 1997, 75(1), p.28-35, With French summary. 38 refs.

Plant ecology, Plant physiology, Plant tissues, Acclimatization, Low temperature tests, Frost resistance, Electrical resistivity, Cold tolerance, Simulation

51-4916

Responses of the Norwegian alpine *Betula nana* community to nitrogen fertilization.

Paal, J., Fremstad, E., Möis, T., *Canadian journal of botany,* Jan. 1997, 75(1), p.108-120, With French summary. Refs. p.118-120.

Plant ecology, Alpine tundra, Tundra vegetation, Vegetation patterns, Tundra soils, Air pollution, Nutrient cycle, Simulation, Environmental tests, Statistical analysis, Norway

51-4917

Limitations on reproduction in alpine *Ranunculus acris*.

Totland, O., *Canadian journal of botany,* Jan. 1997, 75(1), p.137-144, With French summary. Refs. p.143-144.

Plant ecology, Alpine landscapes, Grasses, Growth, Pollen, Cold weather tests, Frost, Damage, Sampling, Statistical analysis

51-4918

Indices of plant N availability in an alpine grassland under elevated atmospheric CO_2.

Arnone, J.A., III, *Plant and soil,* Mar. 1997, 190(1), p.61-66, 38 refs.

Plant ecology, Alpine landscapes, Climatic factors, Meadow soils, Grasses, Biomass, Nutrient cycle, Carbon dioxide, Growth, Simulation, Seasonal variations

51-4919

Cascading Fermi resonances and the soft mode in dense ice.

Struzhkin, V.V., Goncharov, A.F., Hemley, R.J., Mao, H.K., *Physical review letters*, June 9, 1997, 78(23), p.4446-4449, 26 refs.

Ice physics, Ice spectroscopy, Infrared spectroscopy, High pressure ice, Deuterium oxide ice, Resonance, Vibration, Phase transformations, Hydrogen bonds, Radiation absorption, Spectra

51-4920

Elevated CO_2 alters belowground exoenzyme activities in tussock tundra.

Moorhead, D.L., Linkins, A.E., *Plant and soil*, Feb. 1997, 189(2), p.321-329, Refs. p.328-329.

Tundra vegetation, Ecosystems, Plant physiology, Tundra soils, Decomposition, Carbon dioxide, Roots, Nutrient cycle, Biomass, Simulation, Statistical analysis

51-4921

Cosmic rays keep the water flowing in California.

Gordon, M., *New scientist*, Mar. 15, 1997, 153(2073), p.23.

Water supply, Snow hydrology, Snow water equivalent, Runoff forecasting, Sensors, Portable equipment, Gamma irradiation, Detection

51-4922

Moment tensors of microearthquakes from the Eyjafjallajökull volcano in South Iceland.

Dahm, T., Brandsdóttir, B., *Geophysical journal international*, July 1997, 130(1), p.183-192, 33 refs.

Geological surveys, Earth crust, Seismic surveys, Seismic velocity, Volcanoes, Subpolar regions, Earthquakes, Tectonics, Wave propagation, Magma, Fluid dynamics, Iceland

51-4925

Relation between soil age and silicate weathering rates determined from the chemical evolution of a glacial chronosequence: comment and reply.

Dahms, D.E., et al, *Geology*, Apr. 1997, 25(4), p.381-383, 21 refs. For pertinent paper see 50-1806.

Glacial geology, Glacier oscillation, Geochronology, Moraines, Soil profiles, Soil dating, Geochronology, Geochemistry, Models

51-4926

Analysis of ions in polar ice core samples by use of large injection volumes in ion chromatography.

Ivask, J., Pentchuk, J., *Journal of chromatography A*, May 16, 1997, 770(1-2), International Ion Chromatography Symposium, 9th, Reading, UK, Sep. 16-19, 1996. Proceedings, p.125-127, 7 refs.

Paleoclimatology, Ice sheets, Ice cores, Ion diffusion, Ice composition, Impurities, Chemical analysis

In the present study a non-suppressed ion chromatography system with conductivity detection was tested in terms of sampling effects, the effects on the ion separation efficiency and analysis detection limits to find optimum conditions for the determination of chloride, nitrate, sulfate, sodium, ammonium, potassium, calcium and magnesium ions in polar ice core samples from Dome B, East Antarctica. (Auth. mod.)

51-4927

Analysis of anisotropic mantle viscosity, and its possible effects on post-glacial rebound.

Han, D.Z., Wahr, J., *Physics of the earth and planetary interiors*, June 1997, 102(1-2), p.33-50, 42 refs.

Tectonics, Viscoelasticity, Anisotropy, Ice loads, Isostasy, Ice models, Ice cover effect, Sea level, Gravity anomalies, Mathematical models

51-4928

Seed floating ability and distribution of alpine plants along a northern Swedish river.

Danvind, M., Christer, N., *Journal of vegetation science*, May 1997, 8(2), p.271-276, 23 refs.

Plant ecology, River flow, Alpine landscapes, Revegetation, Vegetation patterns, Littoral zone, Migration, Sediment transport, Distribution, Buoyancy, Sampling, Classifications, Sweden

51-4929

Regional radiocarbon effect due to thawing of frozen earth.

Damon, P.E., Burr, G., Peristykh, A.N., Jacoby, G.C., D'Arrigo, R.D., *Radiocarbon*, 1996, 38(3), p.597-602, 11 refs.

Paleoecology, Paleoclimatology, Climatic changes, Trees (plants), Carbon dioxide, Isotope analysis, Radioactive age determination, Geochronology, Snowmelt, Ground thawing, Vapor transfer

51-4930

High northern palaeolatitude Jurassic-Cretaceous palaeotemperature variation: new data from Kong Karls Land, Svalbard.

Ditchfield, P.W., *Palaeogeography, palaeoclimatology, palaeoecology*, May 1997, 130(1-4), p.163-175, 43 refs.

Pleistocene, Paleoclimatology, Air temperature, Subpolar regions, Earth crust, Sediments, Stratigraphy, Diagenesis, Isotope analysis, Temperature variations, Norway—Svalbard

51-4931

18 million year record of vegetation and climate change in northwestern Canada and Alaska: tectonic and global climatic correlates.

White, J.M., et al, *Palaeogeography, palaeoclimatology, palaeoecology*, May 1997, 130(1-4), p.293-306, Refs. p.304-306.

Geological surveys, Pleistocene, Paleoclimatology, Climatic changes, Paleoecology, Palynology, Tectonics, Quaternary deposits, Age determination, Correlation, Canada—Northwest Territories, United States—Alaska

51-4932

High-resolution multi-proxy climate records from Chinese loess: evidence for rapid climatic changes over the last 75 kyr.

Chen, F.H., Bloemendal, J., Wang, J.M., Li, J.J., Oldfield, F., *Palaeogeography, palaeoclimatology, palaeoecology*, May 1997, 130(1-4), p.323-335, 50 refs.

Pleistocene, Paleoclimatology, Climatic changes, Quaternary deposits, Loess, Stratigraphy, Remanent magnetism, Ice cores, Geochronology, Correlation, China—Longxi Loess Plateau

51-4933

Electric properties of deep crustal rocks of Iceland at high temperatures.

Khasaev, B.A., Genshaft, IU.S., Sholpo, A.V., Saltikovskiĭ, A.IA., Sattarov, M.M., *Physics of the solid earth*, July 1994, 29(12), p.1094-1100, Translated from Fizika zemli. 13 refs.

Geological surveys, Subpolar regions, Earth crust, Geothermy, Temperature distribution, Magma, Rock properties, Electrical properties, Electrical resistivity, Sampling, Temperature distribution, Iceland

51-4934

Rock-magnetism research on deep rocks in Iceland.

Lykov, A.V., Sholpo, A.V., Genshaft, IU.S., *Physics of the solid earth*, Apr. 1994, 29(9), p.795-808, Translated from Fizika zemli. 9 refs.

Geological surveys, Subpolar regions, Earth crust, Rock properties, Rock magnetism, Geochemistry, Anisotropy, Magma, Sampling, Classifications, Statistical analysis, Iceland

51-4935

Composition of the third crustal layer beneath Iceland.

Genshaft, IU.S., Bdoian, A.A., Sholpo, A.V., Saltikovskiĭ, A.IA., IUkhanian, A.K., *Physics of the solid earth*, May 1993, 28(10), p.858-869, Translated from Fizika zemli. 29 refs.

Geophysical surveys, Earth crust, Tectonics, Rock properties, Stratification, Magma, Sampling, High pressure tests, Elastic waves, Velocity measurement, Iceland

51-4936

Holocene climatic instability: a prominent, widespread event 8200 yr ago.

Alley, R.B., Mayewski, P.A., Sowers, T., Stuiver, M., Taylor, K.C., Clark, P.U., *Geology*, June 1997, 25(6), p.483-486, 51 refs.

Paleoclimatology, Climatic changes, Ice sheets, Ice cores, Ice dating, Dust, Natural gas, Aerosols, Geochronology, Correlation

51-4937

Hummock fields in the Norway Basin and eastern Iceland Plateau: Rayleigh-Taylor instabilities?

Vogt, P.R., *Geology*, June 1997, 25(6), p.531-534, 16 refs.

Marine geology, Subpolar regions, Ocean bottom, Topographic features, Hummocks, Sedimentation, Gravity, Radio echo soundings, Imaging, Profiles, Sensor mapping, Norwegian Sea

51-4938

CASP annual report—1 February 1996-31 January 1997.

Cambridge Arctic Shelf Programme, Cambridge, 1997, 19p.

Research projects, International cooperation, Oceanographic surveys, Geological surveys, Exploration, Organizations, Meetings

51-4939

Snow survey bulletin & water supply forecast, May 1, 1997, Yukon Territory.

Canada. Indian and Northern Affairs. Water Resources Division, Whitehorse, 1997, 27p.

Snow surveys, Runoff forecasting, Snow depth, Snow water equivalent, Stream flow, Canada—Yukon Territory

51-4940

Method for forming a sloped face ice control structure.

Lever, J.H., Gooch, G.E., Folton, E.P., MP 4054, *U.S. Patent Office. Patent*, Oct. 22, 1996, 4 col., USP-5,567,078, 8 refs.

River ice, Ice breakup, Ice jams, Ice control, Flood control, River flow, Flow control, Hydraulic structures, Rock fills

The present invention pertains to sloped-faced ice control elements that are each spaced apart across a riverbed adjacent to a floodplain region. The elements arrest a breakup ice run. The size and spacing of the ice-resisting elements can vary with river size and average ice piece size diameter. The ice-resisting elements, for example, can comprise three or four quarried granite blocks buried in the riverbed in a relatively narrow river of 100 feet or less. This arrangement allows gaps between each ice-resisting element for easy canoe and fish passage. These gaps prevent the ice pieces of the ice jam from passing through during breakup ice runs. The ice-resisting elements may be formed from various materials such as quarried rock, poured concrete, rock-filled cribs, etc. After the ice-resisting elements have retained and stabilized the ice jam, water levels recede and warming water temperatures melt the ice in place behind the ice-resisting elements.

51-4941

Microwave Doppler radar system for detection and kinematic measurements of river ice.

Yankielun, N.E., Ferrick, M.G., MP 4055, *U.S. Patent Office. Patent*, Dec. 17, 1996, 10 col., USP-5,585,799, 5 refs.

River ice, Ice breakup, Drift, Ice detection, Ice forecasting, Ice reporting, Flood forecasting, Warning systems, Radar tracking

The present invention pertains to a microwave continuous wave (CW) Doppler radar system for river ice motion detection and real-time kinematic data acquisition using digital signal processing equipment for processing, storing and displaying such data. With less complex electronic signal processing hardware, a Doppler radar ice motion detection and alarming system can be used in conjunction with the system. River ice kinematic measurements are fundamental to analyses of river/ice dynamics. The system herein can be rapidly deployed, requires minimal operator interaction, and can continuously acquire, process, store and display ice kinematic data regardless of visibility conditions. Use of the Doppler radar system is an effective, efficient and precise method and apparatus for obtaining river ice kinematic data.

51-4942

Geosynthetic barrier to prevent wildlife access to contaminated sediments.

Henry, K.S., MP 4056, *U.S. Patent Office. Patent*, Feb. 11, 1997, 4 col., USP-5,601,906, 5 refs.

Soil pollution, Soil stabilization, Land reclamation, Animals, Environmental protection, Geotextiles

A geosynthetic barrier adapted to deny wildlife access to contaminated sediments (CS), includes a geocomposite formed of a top layer juxtaposed on a bottom layer which is adapted to be placed on the sediments. The top layer includes a geosynthetic drainage matrix having a plurality of openings, and the bottom layer includes a geotextile having a plurality of openings formed so as to allow gases to escape from the contaminated sediments on which said geocomposite is placed. The openings in the bottom layer of the geosynthetic barrier have a size in the range up to 200 cm and are spaced apart on centers having a range of between 6 cm to 600 cm, for example. The geosynthetic drainage matrix may be a geonet, a geogrid or a geomesh, fabricated from polyethylene, polypropylene, high density polyethylene, low density polyethylene, polystyrene, or high impact polystyrene. The top and bottom layers may be either separate layers, or may be joined together to produce a unified geocomposite web; may be held in place by a gravel layer (G) or other means; may be used in a subaqueous (W) or a non-subaqueous environment; and may provide a suitable environment through which vegetation (V) can be rooted.

51-4943

Clapeyron thermometer.

Black, P.B., MP 4057, *U.S. Patent Office. Patent,* Mar. 11, 1997, 4 col., USP-5,609,418, 9 refs.

Temperature measurement, Liquid solid interfaces, Solid phases, Liquid phases, Ice water interface, Ice pressure, Water pressure, Measuring instruments

A high resolution thermometer operated by the pressure of a solid/liquid phase mixture is characterized by a vessel containing the mixture, a pressure sensor and a pressure indicator. A relatively small change in the temperature to be measured causes the proportion of solid and liquid in the vessel to change, thereby producing a dramatic change in pressure which can be measured with greater accuracy than the relatively small temperature change. Temperature is determined by converting the pressure to temperature using the appropriate thermodynamic relationship.

51-4944

Wind, temperature and ice motion statistics in the Weddell Sea (a compilation based on data from drifting buoys, vessels, and operational weather analyses).

Kottmeier, C., Ackley, S.F., Andreas, E.L., MP 4058, *World Meteorological Organization. Technical document,* Jan. 1997, WMO/TD-No.797, World Climate Research Programme (WCRP). International Programme for Antarctic Buoys (IPAB), 48p., 32 refs.

Sea ice distribution, Drift, Ice air interface, Air ice water interaction, Wind velocity, Air temperature, Atmospheric pressure, Drift stations, Statistical analysis, Antarctica—Weddell Sea

The data from sea ice buoys, which were deployed during the Winter Weddell Sea Project 1986, the Winter Weddell Gyre Studies 1989 and 1992, the Ice Station Weddell in 1992, the Antarctic Zone Flux Experiment in 1994, and several ship cruises in austral summers, are uniformly reanalyzed by the same objective methods. The buoys were capable of monitoring atmosphere pressure, air and ice temperatures, as well as position. The buoys were frequently arranged within groups of three to seven to allow calculation of reliable estimates of geostrophic winds and ice motion and under favorable conditions their spatial derivatives. Geostrophic winds for buoys operational regions are derived after matching of the buoy pressure data with the surface pressure fields of the European Centre for Medium Range Weather Forecasts. Historical data from drifting ships are included in the temperature, air pressure and ice drift analyses. This report documents the mean structure as well as the variability of ice motion and spatial derivatives of ice motion, the statistics of surface pressure, geostrophic winds and air temperatures in the sea ice covered part of the Weddell Sea. (Auth. mod.)

51-4945

Summary of reported water-use data in Alaska, 1994.

Ireland, R., Mauer, M.A., *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Public-data file,* Dec. 1995, No.95-34, 44p., 7 refs.

Water reserves, Water supply, Utilities, Regional planning, United States—Alaska

51-4946

Methane in coastal sea water, sea ice, and bottom sediments, Beaufort Sea, Alaska.

Lorenson, T.D., Kvenvolden, K., *U.S. Geological Survey. Open-file report,* 1995, No.95-70, 84p., 18 refs.

Polar atmospheres, Marine atmospheres, Atmospheric composition, Bottom sediment, Marine deposits, Suspended sediments, Sea water, Water chemistry, Ice composition, Ice cover effect, Air ice water interaction, Hydrates, Geochemical cycles, Global warming, Beaufort Sea, United States—Alaska

51-4947

Guidelines for housing and human settlement planning and design criteria in cold climates, Greenland.

Greenland Technical Organization (Grønlands Tekniske Organisation) (GTO), Copenhagen, Denmark, Copenhagen, Denmark, World Health Organization, Regional Office for Europe, 1984, 162p.

Houses, Residential buildings, Cold weather construction, Regional planning, Urban planning, Utilities, Sanitary engineering, Health, Greenland

51-4948

Report of the preliminary evaluation of the Behrends Avenue avalanche path.

Hart, K., Geophysical Hazards Investigation for the City and Borough of Juneau, Alaska. Technical supplement. Appendix 5, Juneau, AK, 1972, p.95-148, 11 refs. Submitted in Jan. 1967.

Avalanches, Accidents, Avalanche tracks, Avalanche forecasting, Avalanche engineering, United States—Alaska—Juneau

51-4949

Behrends Avenue avalanche and other avalanche hazards in the Greater Juneau Borough.

LaChapelle, E.R., Geophysical Hazards Investigation for the City and Borough of Juneau, Alaska. Technical supplement. Appendix 6, Juneau, AK, 1972, p.149-172, Submitted in Nov. 1968.

Avalanches, Accidents, Avalanche tracks, Avalanche forecasting, Avalanche engineering, United States—Alaska—Juneau

51-4950

Conceptual study of the Arctic Drift Barge.

Lawrence, K., ed, Groton, CT, General Dynamics, Electric Boat Division, 1966, Var. p.

Oceanographic ships, Floating structures, Drift stations, Nuclear power, Ice navigation, Ice solid interface, Ice loads, Ice pressure, Ice control

51-4951

Community water & sanitation services, Northwest Territories. Yellowknife, Northwest Territories, Department of Local Government, Water and Sanitation Section, Nov. 1981, 352p., Refs. passim.

Water supply, Water treatment, Sewage disposal, Sanitary engineering, Utilities, Municipal engineering, Regional planning, Canada—Northwest Territories

51-4952

Chemical analysis of snow and ice samples—sensitive measurement of ^{210}Pb in snow and ice samples using alpha spectrometry.

Suzuki, T., Ohta, K., Fujii, Y., Watanabe, O., *Antarctic record,* Nov. 1996, 40(3), p.321-332, In Japanese with English summary. Refs. p.331-332.

Snow composition, Ice composition, Chemical analysis, Radioactive age determination, Atmospheric composition, Ice dating, Norway—Svalbard

51-4953

Performance test of seismic data loggers in Antarctica.

Tanaka, T., Kanao, M., *Antarctic record,* Nov. 1996, 40(3), p.333-346, In Japanese with English summary. 5 refs.

Seismology, Recording instruments, Low temperature research, Performance, Cold weather tests, Antarctica—Showa Station

During JARE-36, from Feb. 1995 to Jan. 1996, seismic observations using data loggers around Showa Station were carried out. Experiments to evaluate the performance of the loggers under meteorological conditions of Antarctica, such as low temperature, showed that the loggers operated normally when a heater and blanket were used as protection against the cold. However, high voltage offsets and increasing input noise are seen at temperatures below -40°C. In the spring and summer seasons, observations were carried out without any problems. (Auth. mod.)

51-4954

Late Quaternary paleoecology of *Thuja* and *Juniperus* (Cupressaceae) at Crawford Lake, Ontario, Canada: pollen, stomata and macrofossils.

Yu, Z.C., *Review of palaeobotany and palynology,* May 1997, 96(3-4), p.241-254, Refs. p.252-254.

Trees (plants), Paleoecology, Lacustrine deposits, Quaternary deposits, Stratigraphy, Palynology, Fossils, Drill core analysis, Classifications, Canada—Ontario—Crawford Lake

51-4955

Experimental confirmation of the instability of the crystal structure of *Ih* ice prior to amorphization under pressure.

Stal'gorova, O.V., Gromnitskaia, E.L., Brazhkin, V.V., *JETP letters,* Aug. 1995, 62(4), p.356-360, Translated from Pis'ma v zhurnal ėksperimental'noi i teoreticheskoi fiziki. 16 refs.

Ice physics, Ice acoustics, Amorphous ice, Ice crystal structure, Phase transformations, Ultrasonic tests, Wave propagation, Velocity measurement, Shear modulus, Ice volume, High pressure tests, Temperature effects

51-4956

Carbonyls and nonmethane hydrocarbons at rural European sites from the Mediterranean to the Arctic.

Solberg, S., Dye, C., Schmidbauer, N., Herzog, A., Gehrig, R., *Journal of atmospheric chemistry,* Sep. 1996, 25(1), p.33-66, Refs. p.64-66.

Climatology, Air pollution, Atmospheric composition, Sampling, Aerosols, Hydrocarbons, Photochemical reactions, Degradation, Polar atmospheres, Statistical analysis, Seasonal variations, Environmental tests

51-4957

Interannual variability of temperature in the polar stratosphere during the winter: the influence of the QBO phase and an 11-yr solar cycle.

Sukharev, B.E., *Journal of atmospheric and solar-terrestrial physics,* Mar. 1997, 59(5), p.469-477, 28 refs.

Climatology, Air temperature, Polar atmospheres, Seasonal variations, Stratosphere, Atmospheric circulation, Solar radiation, Statistical analysis, Correlation

51-4958

Thermoluminescence (TL) and ESR study of γ-irradiated SO_2 frost for future dating in outer planets.

Kanosue, K., Toda, H., Hirai, M., Kanamori, H., Ikeya, M., *Radiation measurements,* Apr. 1997, 27(2), International Conference on Luminescence and Electron Spin Resonance Dating, 8th, Canberra, Australia, Apr. 22-26, 1996. Proceedings, p.399-403, 11 refs.

Extraterrestrial ice, Frost, Simulation, Luminescence, Electron paramagnetic resonance, Gamma irradiation, Ice dating, Spectra, Photochemical reactions

51-4959

Fluctuations in the thermoluminescence signal of suspended sediment in an alpine glacial meltwater stream.

Gemmell, A.M.D., *Quaternary geochronology,* Apr.-June 1997, 16(3-5), International Conference on Luminescence and Electron Spin Resonance Dating, 8th, Canberra, Australia, Apr. 22-26, 1996. Proceedings, p.281-290, 32 refs.

Glacial hydrology, Meltwater, Stream flow, Suspended sediments, Luminescence, Degradation, Sampling, Age determination, Diurnal variations, Correlation

51-4960

Effect of thermal transfer on the zeroing of the luminescence of quartz from recent glaciofluvial sediments.

Rhodes, E.J., Bailey, R.M., *Quaternary geochronology,* Apr.-June 1997, 16(3-5), International Conference on Luminescence and Electron Spin Resonance Dating, 8th, Canberra, Australia, Apr. 22-26, 1996. Proceedings, p.291-298, 18 refs.

Glacial geology, Glacial deposits, Sampling, Luminescence, Age determination, Accuracy, Laboratory techniques, Heating

51-4961

Dating of Quaternary lake sediments from the Schirmacher Oasis (East Antarctica) by infra-red stimulated luminescence (IRSL) detected at the wavelength of 560 nm.

Krause, W.E., Krbetschek, M.R., Stolz, W., *Quaternary geochronology,* Apr.-June 1997, 16(3-5), International Conference on Luminescence and Electron Spin Resonance Dating, 8th, Canberra, Australia, Apr. 22-26, 1996. Proceedings, p.387-392, 17 refs.

Lacustrine deposits, Quaternary deposits, Soil dating, Age determination, Geochronology, Luminescence, Spectra, Antarctica—Schirmacher Ponds

Twelve samples from 3 antarctic lake cores were selected for dating by a method using infra-red stimulated luminescence. A spectral study of the luminescence signal from coarse grain plagioclase feldspars by a high sensitivity TL/OSL spectrometer using a CCD-camera showed four wavelength maxima, and the comparison of the equivalent doses (D_E) measured at these wavelengths, namely 280, 330, 410 and 560 nm, yielded different values. The ages were calculated using D_E obtained at 560 nm. (Auth.)

51-4962

Future ESR and optical dating of outer planet icy materials.

Ikeya, M., Sasaoka, H., Toda, H., Kanosue, K., Hirai, M., *Quaternary geochronology,* Apr.-June 1997, 16(3-5), International Conference on Luminescence and Electron Spin Resonance Dating, 8th, Canberra, Australia, Apr. 22-26, 1996. Proceedings, p.431-435, 22 refs.

Ice physics, Extraterrestrial ice, Satellites (natural), Ice dating, Doped ice, Luminescence, Portable equipment, Design, Simulation, Performance, Laboratory techniques

51-4963

Ice induced vibrations of the Molikpaq. Part 1: model tests.

Timco, G.W., Cornett, A.M., Singh, S.K., Farnand, J., *National Research Council Canada. Canadian Hydraulics Centre. Technical report,* Mar. 1996, HYD-TR-007, 72p. + appends., 30 refs.

Offshore structures, Caissons, Ice solid interface, Ice loads, Ice pressure, Ice friction, Ice deformation, Damping, Environmental tests, Strain tests

51-4964

Ice induced vibrations of the Molikpaq. Part 2: analysis of model tests.

Timco, G.W., Cornett, A.M., *National Research Council Canada. Canadian Hydraulics Centre. Technical report,* Mar. 1997, HYD-TR-023, 96p. + appends., 23 refs.

Offshore structures, Caissons, Ice solid interface, Ice loads, Ice pressure, Ice friction, Ice deformation, Damping, Stress concentration, Environmental tests

51-4965

Review of ice cover thermodynamics.

Sayed, M., ed, *National Research Council Canada. Canadian Hydraulics Centre. Technical report,* Aug. 1996, HYD-TR-014, Var. p., Refs. passim. Includes contributions by S.B. Savage, V.A. Squire, and A. Okhotsimskiĭ.

Ice cover thickness, Ice forecasting, Ice growth, Ice melting, Ice heat flux, Ice edge, Ice water interface, Ice air interface, Ice models, Computer programs, Mathematical models

51-4966

Discrete model for mesoscale ice forecasting.

Sayed, M., Savage, S.B., Serrer, M., *National Research Council Canada. Canadian Hydraulics Centre. Technical report,* Aug. 1996, HYD-TR-015, 10p. + appends., Refs. passim.

Sea ice distribution, Ice floes, Ice edge, Drift, Ice friction, Ice deformation, Ice forecasting, Ice models, Computer programs, Mathematical models

51-4967

Marginal ice zone rheology: comparison of results from continuum plastic models and discrete particle simulations.

Gutfraind, R., Savage, S.B., *National Research Council Canada. Canadian Hydraulics Centre. Technical report,* Sep. 1996, HYD-TR-016, 65p., 37 refs.

Sea ice distribution, Ice edge, Ice floes, Drift, Ice water interface, Ice friction, Ice plasticity, Ice deformation, Ice forecasting, Ice models, Computerized simulation, Mathematical models

51-4968

Marginal ice zone rheology: the effect of complex boundaries and constrained channels.

Gutfraind, R., Savage, S.B., *National Research Council Canada. Canadian Hydraulics Centre. Technical report,* Sep. 1996, HYD-TR-018, 53p., 26 refs.

Sea ice distribution, Ice edge, Ice floes, Drift, Ice water interface, Ice air interface, Ice friction, Hydrodynamics, Ice deformation, Ice forecasting, Ice models, Computerized simulation, Mathematical models

51-4969

Canadian Ice Regime System database.

Timco, G.W., Morin, I., *National Research Council Canada. Canadian Hydraulics Centre. Technical report,* Mar. 1997, HYD-TR-024, 50p., Refs. passim.

Sea ice distribution, Ice conditions, Ice forecasting, Ice reporting, Ice navigation, Ice routing, Safety, Data processing, Computerized simulation

51-4970

Flexural strength of ice with non-uniform thickness.

Timco, G.W., Cornett, A.M., *National Research Council Canada. Canadian Hydraulics Centre. Technical report,* Mar. 1996, HYD-TR-008, 38p. + append., 9 refs.

Ice cover thickness, Ice cover strength, Flexural strength, Ice solid interface, Ice loads, Ice pressure, Ice deformation, Ice breaking

51-4971

Glaciation and sea-level change for Ireland and the Irish Sea since Late Devensian/Midlandian time.

Lambeck, K., *Journal of the Geological Society, London,* Nov. 1996, 155(6), p.853-872, 54 refs.

Sea level, Ice cover, Glaciation, Isostasy, Ireland, Irish Sea

51-4972

Entrainment of glaciomarine sediments and formation of thrust-block moraines at the margin of Sørsdal Glacier, East Antarctica.

Fitzsimons, S.J., *Earth surface processes and landforms,* Feb. 1997, 22(2), p.175-187, 25 refs.

Moraines, Sediments, Tectonics, Geomorphology, Glaciers, Ice models, Antarctica—Prydz Bay, Antarctica—Vestfold Hills, Antarctica—Sørsdal Glacier

The morphology, sedimentology and structure of moraines at the margin of an outlet glacier in East Antarctica are described, and contemporary depositional processes in a marine inlet adjacent to the ice margin are examined. Results indicate that the principal moraines are thrust-block moraines produced by basal freezing and deformation of glaciomarine sediment as the outlet glacier expands into a marine inlet. Preservation of detailed glaciomarine sedimentary structures and beds of marine shells suggests that the sediment was frozen during entrainment, transportation and deposition. The presence of low-angle faults in the moraines shows that the moraines consist of an *en echelon* arrangement of thrust plates. The sedimentology, structure, thickness of the thrust plates, and inferred entrainment processes are consistent with Weertman's ice-debris accretion hypothesis for debris entrainment at the edge of cold ice sheets. A model of thrust-block moraine development produced by this study provides a framework for the interpretation of radiocarbon dates from marine macrofossils in the moraines. The model may also be useful in the interpretation of similar moraines in coastal East Antarctica oases and other polar marginal marine environments. (Auth.)

51-4973

Proceedings.

International Workshop in the Resistance of Concrete to Scaling Due to Freezing in the Presence of De-icing Salts, Freeze-thaw durability of concrete. Edited by J. Marchand et al, Suffolk, E & FN Spon, 1997, 274p., Refs. passim. Includes selected papers from the International Workshop on Freeze-thaw and De-icing Resistance of Concrete, Lund, Sweden. For individual papers see 51-4974 through 51-4989.

DLC TA440.I54

Concrete durability, Frost resistance, Concrete aggregates, Cold weather performance, Freeze thaw tests, Freeze thaw cycles, Salt water, Salting, Degradation, Damage, Design criteria

51-4974

Action of frost and deicing chemicals—basic phenomena and testing.

Setzer, M.J., Freeze-thaw durability of concrete. Edited by J. Marchand et al, Suffolk, E & FN Spon, 1997, p.3-22, 38 refs.

DLC TA440.I54

Concrete durability, Frost action, Chemical ice prevention, Porosity, Classifications, Capillarity, Water transport, Freeze thaw cycles, Freezing points, Mechanical tests, Laboratory techniques, Standards

51-4975

On the service life of concrete exposed to frost action.

Fagerlund, G., Freeze-thaw durability of concrete. Edited by J. Marchand et al, Suffolk, E & FN Spon, 1997, p.23-41, 34 refs.

DLC TA440.I54

Concrete durability, Frost action, Frost resistance, Cold weather performance, Saturation, Salinity, Thermal expansion, Freeze thaw cycles, Air entrainment, Capillarity, Porosity, Theories

51-4976

High strength concrete without air entrainment: effect of rapid temperature cycling above and below 0°-C.

Sellevold, E.J., Bakke, J.A., Jacobsen, S., Freeze-thaw durability of concrete. Edited by J. Marchand et al, Suffolk, E & FN Spon, 1997, p.43-50, 7 refs.

DLC TA440.I54

Concrete durability, Concrete aggregates, Freeze thaw cycles, Ice formation, Degradation, Damage, Mechanical tests, Low temperature tests, Temperature effects

51-4977

Scaling, absorption and dilation of cement mortars exposed to salt/frost.

Fagerlund, G., Freeze-thaw durability of concrete. Edited by J. Marchand et al, Suffolk, E & FN Spon, 1997, p.51-66, 3 refs.

DLC TA440.I54

Concrete durability, Cement admixtures, Mortars, Surface properties, Frost action, Corrosion, Solutions, Salt water, Freeze thaw tests, Freeze thaw cycles, Absorption, Saturation

51-4978

Scaling resistance of BHP. [La résistance à l'écaillage des BHP]

Gagné, R., Marchand, J., Freeze-thaw durability of concrete. Edited by J. Marchand et al, Suffolk, E & FN Spon, 1997, p.69-91, In French. 85 refs.

DLC TA440.I54

Concrete durability, Frost resistance, Degradation, Freeze thaw cycles, Freeze thaw tests, Cement admixtures, Porosity, Air entrainment, Cold weather performance, Design criteria

51-4979

Frost/salt scaling and ice formation of concrete: effect of curing temperature and silica fume on normal and high strength concrete.

Jacobsen, S., Sellevold, E., Freeze-thaw durability of concrete. Edited by J. Marchand et al, Suffolk, E & FN Spon, 1997, p.93-105, 9 refs.

DLC TA440.I54

Concrete durability, Concrete admixtures, Aggregates, Frost resistance, Frost action, Salt water, Degradation, Ice formation, Saturation, Concrete curing, Freeze thaw cycles, Freeze thaw tests, Temperature effects

51-4980

Freeze-deicing salt resistance of concretes containing blast-furnace slag-cement.

Stark, J., Ludwig, H.M., Freeze-thaw durability of concrete. Edited by J. Marchand et al, Suffolk, E & FN Spon, 1997, p.107-120, 18 refs.

DLC TA440.I54

Concrete durability, Concrete admixtures, Concrete aggregates, Freeze thaw cycles, Freeze thaw tests, Frost resistance, Porosity, Saturation, Salting, Degradation

51-4981

Deicing salt scaling resistance of concrete incorporating supplementary cementing materials: CANMET research.

Bilodeau, A., Malhotra, V.M., Freeze-thaw durability of concrete. Edited by J. Marchand et al, Suffolk, E & FN Spon, 1997, p.121-156, 20 refs.

DLC TA440.I54

Concrete durability, Cement admixtures, Flexural strength, Chemical properties, Salting, Salt water, Surface properties, Degradation, Frost resistance, Freeze thaw tests, Freeze thaw cycles

51-4982

Influence of water quality on the frost resistance of concrete.

Stark, J., Ludwig, H.M., Freeze-thaw durability of concrete. Edited by J. Marchand et al, Suffolk, E & FN Spon, 1997, p.157-164, 7 refs.

DLC TA440.I54

Concrete durability, Frost resistance, Concrete aggregates, Degradation, Water chemistry, Chemical properties, Freeze thaw tests, Freeze thaw cycles

51-4983

Efficiency of sealers in the scaling resistance of concrete in presence of deicing salts.

Hazrati, K., Abesque, C., Pigeon, M., Sedran, T., Freeze-thaw durability of concrete. Edited by J. Marchand et al, Suffolk, E & FN Spon, 1997, p.165-196, 11 refs.

DLC TA440.I54

Concrete durability, Frost resistance, Polymers, Sealing, Coatings, Salting, Salt water, Degradation, Freeze thaw tests, Freeze thaw cycles, Performance

51-4984

Reliability of the ASTM C 672 test procedure.

Laroche, M.C., Marchand, J., Pigeon, M., Freeze-thaw durability of concrete. Edited by J. Marchand et al, Suffolk, E & FN Spon, 1997, p.199-209, 9 refs.

DLC TA440.I54

Sidewalks, Concrete durability, Classifications, Cold weather performance, Cold weather tests, Freeze thaw tests, Degradation, Salting, Salt water, Standards

51-4985

Scaling resistance tests of concrete—experience from practical use in Sweden.

Petersson, P.E., Freeze-thaw durability of concrete. Edited by J. Marchand et al, Suffolk, E & FN Spon, 1997, p.211-221, 5 refs.

DLC TA440.I54

Concrete durability, Concrete admixtures, Frost resistance, Air entrainment, Freeze thaw cycles, Freeze thaw tests, Degradation, Salting, Standards

51-4986

Round robin tests on concrete frost resistance.

Kukko, H., Paroll, H., Freeze-thaw durability of concrete. Edited by J. Marchand et al, Suffolk, E & FN Spon, 1997, p.223-230, 4 refs.

DLC TA440.I54

Concrete durability, Concrete aggregates, Design criteria, Flexural strength, Frost resistance, Salt water, Saturation, Mechanical tests, Freeze thaw tests, Accuracy, Standards

51-4987

Three different methods for testing the freeze-thaw resistance of concrete with and without deicing salt.

Siebel, E., Reschke, T., Freeze-thaw durability of concrete. Edited by J. Marchand et al, Suffolk, E & FN Spon, 1997, p.231-246, 4 refs.

DLC TA440.I54

Concrete durability, Frost resistance, Concrete slabs, Salting, Freeze thaw tests, Freeze thaw cycles, Standards, Classifications, Laboratory techniques, Correlation

51-4988

Mass loss experience with ASTM C 666: with and without deicing salt.

Janssen, D.J., Snyder, M.B., Freeze-thaw durability of concrete. Edited by J. Marchand et al, Suffolk, E & FN Spon, 1997, p.247-258, 5 refs.

DLC TA440.I54

Concrete durability, Cement admixtures, Freeze thaw cycles, Frost resistance, Freeze thaw tests, Salt water, Surface properties, Degradation, Mass transfer, Standards, Design criteria

51-4989

Internal comparative tests on frost-deicing-salt resistance.

Studer, W., Freeze-thaw durability of concrete. Edited by J. Marchand et al, Suffolk, E & FN Spon, 1997, p.259-270, 4 refs.

DLC TA440.I54

Concrete durability, Frost resistance, Degradation, Weathering, Freeze thaw cycles, Salt water, Saturation, Temperature variations, Temperature effects, Simulation

51-4990

Weichselian deglaciation of Skåne. [Weichselisens avsmältning från Skåne]

Lagerlund, E., *Svensk geografisk årsbok,* 1987, Vol.63, p.9-26, In Swedish with English summary. Refs. p.24-26.

DLC G25.S8

Pleistocene, Ice sheets, Glacial geology, Quaternary deposits, Glacial deposits, Glacial lakes, Glacier oscillation, Stratigraphy, Lithology, Geological maps, Sweden—Skåne

51-4991

Weathering forms on the horst ridges of Scania, south Sweden. [Bittringsformer på de skånsa åsarna, speciellt Söderåsen]

Nyberg, R., *Svensk geografisk årsbok,* 1987, Vol.63, p.27-41, In Swedish with English summary. 24 refs.

DLC G25.S8

Geological surveys, Landscape development, Rock properties, Frost weathering, Periglacial processes, Frost shattering, Talus, Sweden—Scania

51-4992

Bedrock forms of Skåne—the result of a long evolution. [Berggrundsformer i Skåne—resultatet av en lång utveckling]

Lidmar-Bergström, K., *Svensk geografisk årsbok,* 1987, Vol.63, p.42-59, In Swedish with English summary. 36 refs.

DLC G25.S8

Pleistocene, Geological surveys, Tectonics, Glacial geology, Bedrock, Classifications, Glacial erosion, Weathering, Periglacial processes, Frost shattering, Landscape development, Topographic features, Sweden—Skåne

51-4993

Return of the tundra in Scania during the Younger Dryas period. [Tundrans återkomst i Skåne under Yngre Dryas-tid]

Rapp, A., Schlyter, P., *Svensk geografisk årsbok,* 1987, Vol.63, p.60-69, In Swedish with English summary. 26 refs.

DLC G25.S8

Pleistocene, Paleoclimatology, Glacier oscillation, Stratigraphy, Geomorphology, Periglacial processes, Tundra terrain, Landforms, Nivation, Frost shattering, Tundra climate, Luminescence, Geochronology, Sweden

51-4994

Late Pleistocene palaeogeography of arctic Eurasian shelves.

Pavlidis, IU.A., Dunaev, N.N., Shcherbakov, F.A., *Quaternary international,* July-Aug. 1997, Vol.41/42, p.3-9, 20 refs.

Pleistocene, Glacial geology, Marine deposits, Moraines, Geomorphology, Drill core analysis, Stratigraphy, Grounded ice, Sedimentation, Landforms, Classifications

51-4995

Paleogeography and geochronology in the Russian eastern Arctic during the second half of the Quaternary.

Alekseev, M.N., *Quaternary international,* July-Aug. 1997, Vol.41/42, p.11-15, 11 refs.

Pleistocene, Arctic landscapes, Geocryology, Quaternary deposits, Stratigraphy, Sedimentation, Paleoecology, Periglacial processes, Geochronology, Russia

51-4996

Late Glacial events in the central Russian Arctic.

Astakhov, V., *Quaternary international,* July-Aug. 1997, Vol.41/42, p.17-25, 51 refs.

Pleistocene, Arctic landscapes, Geomorphology, Geocryology, Glacier oscillation, Glacial geology, Landforms, Topographic features, Russia

51-4997

Pereletki and the initiation of glaciation in Siberia.

Galabala, R.O., *Quaternary international,* July-Aug. 1997, Vol.41/42, p.27-32, 15 refs.

Pleistocene, Quaternary deposits, Geomorphology, Glacial geology, Glaciation, Pereletoks, Nivation, Solifluction, Landforms, Russia—Siberia

51-4998

Late Pleistocene glaciation in the northern Chukchi Peninsula.

Laukhin, S.A., *Quaternary international,* July-Aug. 1997, Vol.41/42, p.33-41, 25 refs.

Pleistocene, Arctic landscapes, Glaciation, Glacial geology, Quaternary deposits, Moraines, Stratigraphy, Landforms, Classifications, Geomorphology, Russia—Chukchi Peninsula

51-4999

Late glaciation of Earth: size and volume of ice-sheets.

Velichko, A.A., Kononov, IU.M., Faustova, M.A., *Quaternary international,* July-Aug. 1997, Vol.41/42, p.43-51, 30 refs.

Pleistocene, Glaciation, Ice sheets, Ice volume, Ice edge, Climatic factors, Mathematical models

51-5000

Valdai periglacial zone as an area of cryogenic soil formation.

Morozova, T.D., Nechaev, V.P., *Quaternary international,* July-Aug. 1997, Vol.41/42, p.53-58, 16 refs.

Pleistocene, Cryogenic soils, Geocryology, Periglacial processes, Soil formation, Soil structure, Cryoturbation, Stratigraphy, Classifications, Terminology

51-5001
Climate and vegetation dynamics in the tundra and forest zone during the Late Glacial and Holocene.
Velichko, A.A., Andreev, A.A., Klimanov, V.A., *Quaternary international,* July-Aug. 1997, Vol.41/42, p.71-96, Refs. p.95-96.
Pleistocene, Paleoclimatology, Climatic changes, Tundra climate, Forest tundra, Paleoecology, Quaternary deposits, Stratigraphy, Palynology, Vegetation patterns, Statistical analysis

51-5002
Flora and vegetation in Europe during the Alleröd.
Zelikson, E.M., *Quaternary international,* July-Aug. 1997, Vol.41/42, p.97-101, 17 refs.
Pleistocene, Paleoecology, Forest tundra, Tundra vegetation, Vegetation patterns, Palynology, Quaternary deposits, Periglacial processes, Statistical analysis, Europe

51-5003
Younger Dryas landscape and climate in northern Eurasia and North America.
Borisova, O.K., *Quaternary international,* July-Aug. 1997, Vol.41/42, p.103-109, 57 refs.
Paleoclimatology, Climatic changes, Cooling, Quaternary deposits, Paleoecology, Palynology, Atmospheric circulation, Temperature variations, Statistical analysis, North America

51-5004
Younger Dryas pollen records from central and southern Yakutia.
Andreev, A.A., Klimanov, V.A., Sulerzhitskiĭ, L.D., *Quaternary international,* July-Aug. 1997, Vol.41/42, p.111-117, 16 refs.
Pleistocene, Paleoecology, Palynology, Subarctic landscapes, Continuous permafrost, Quaternary deposits, Vegetation patterns, Tundra vegetation, Landscape development, Radioactive age determination, Russia—Yakutia

51-5005
Peculiarities of radiocarbon chronology of Younger Dryas deposits in the Taymyr Peninsula.
Sulerzhitskiĭ, L.D., *Quaternary international,* July-Aug. 1997, Vol.41/42, p.119-123, 6 refs.
Geochronology, Pleistocene, Quaternary deposits, Fossils, Sediments, Radioactive age determination, Stratigraphy, Accuracy, Russia—Taymyr Peninsula

51-5006
Latest Pleistocene in southwestern Siberia and Kazakhstan.
Kremenetskiĭ, K.V., Tarasov, P.E., Cherkinskiĭ, A.E., *Quaternary international,* July-Aug. 1997, Vol.41/42, p.125-134, 22 refs.
Pleistocene, Quaternary deposits, Lacustrine deposits, Stratigraphy, Palynology, Classifications, Radioactive age determination, Paleoecology, Vegetation patterns, Russia—Siberia, Kazakhstan

51-5007
Younger Dryas pollen records from Sverdrup Island (Kara Sea).
Andreev, A.A., Tarasov, P.E., Romanenko, F.A., Sulerzhitskiĭ, L.D., *Quaternary international,* July-Aug. 1997, Vol.41/42, p.135-139, 24 refs.
Pleistocene, Paleoclimatology, Climatic changes, Arctic landscapes, Palynology, Paleoecology, Vegetation patterns, Quaternary deposits, Radioactive age determination, Lithology, Russia—Sverdrup Island

51-5008
Late Glacial climate in northern Eurasia: the last climatic cycle.
Klimanov, V.A., *Quaternary international,* July-Aug. 1997, Vol.41/42, p.141-152, Refs. p.151-152.
Paleoclimatology, Pleistocene, Climatic changes, Temperature variations, Cooling, Paleoecology, Statistical analysis

51-5009
Evolution of lakes in the Poles'ye in the Late Glacial and Holocene.
Zernitskaia, V.P., *Quaternary international,* July-Aug. 1997, Vol.41/42, p.153-160, 14 refs.
Pleistocene, Landscape development, Geomorphology, Lakes, Permafrost, Lacustrine deposits, Palynology, Stratigraphy, Belarus

51-5010
Geologic studies in Alaska by the U.S. Geological Survey, 1994.
Moore, T.E., ed, Dumoulin, J.A., ed, *U.S. Geological Survey. Bulletin,* 1996, No.2152, 217p., Refs. passim. For selected papers see 51-5011 through 51-5014.
Mining, Minerals, Soil pollution, Water pollution, Hydrogeochemistry, Geochemistry, Geological surveys, Exploration, Geochronology, United States—Alaska

51-5011
Acid mine drainage associated with volcanogenic massive sulfide deposits, Prince William Sound, Alaska.
Goldfarb, R.J., Nelson, S.W., Taylor, C.D., D'Angelo, W.M., Meier, A.L., *U.S. Geological Survey. Bulletin,* 1996, No.2152, Geologic studies in Alaska by the U.S. Geological Survey, 1994. Edited by T.E. Moore and J.A. Dumoulin, p.3-16, 18 refs.
Mining, Tailings, Soil pollution, Water pollution, Waste disposal, Leaching, Hydrogeochemistry, Streams, Water chemistry, Land reclamation, United States—Alaska—Prince William Sound

51-5012
Environmental geochemistry of mercury deposits in southwestern Alaska: mercury contents in fish, stream-sediment, and stream-water samples.
Gray, J.E., Meier, A.L., O'Leary, R.M., Outwater, C., Theodorakos, P.M., *U.S. Geological Survey. Bulletin,* 1996, No.2152, Geologic studies in Alaska by the U.S. Geological Survey, 1994. Edited by T.E. Moore and J.A. Dumoulin, p.17-29, 33 refs.
Mining, Soil pollution, Water pollution, Hydrogeochemistry, Geochemistry, Streams, Water chemistry, Nutrient cycle, Physiological effects, Environmental impact, Health, United States—Alaska

51-5013
Natural environmental effects associated with the Drenchwater zinc-lead-silver massive sulfide deposit with comparisons to the Red Dog and Lik deposits, west-central Brooks Range, Alaska.
Kelley, K.D., Taylor, C.D., *U.S. Geological Survey. Bulletin,* 1996, No.2152, Geologic studies in Alaska by the U.S. Geological Survey, 1994. Edited by T.E. Moore and J.A. Dumoulin, p.31-45, 37 refs.
Minerals, Geochemistry, Hydrogeochemistry, Leaching, Weathering, Environmental impact, Streams, Water pollution, Water chemistry, United States—Alaska—Brooks Range

51-5014
Environmental geochemistry of the McKinley Lake gold mining district, Chugach National Forest, Alaska.
Trainor, T.P., Fleisher, S., Wildeman, T.R., Goldfarb, R.J., Huber, C.S., *U.S. Geological Survey. Bulletin,* 1996, No.2152, Geologic studies in Alaska by the U.S. Geological Survey, 1994. Edited by T.E. Moore and J.A. Dumoulin, p.47-57, 19 refs.
Mining, Gold, Tailings, Soil pollution, Water pollution, Hydrogeochemistry, Geochemistry, Streams, Water chemistry, United States—Alaska—Chugach National Forest

51-5015
Post-symposium proceedings. Vol.3.
IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996, Beijing, Chinese Hydraulic Engineering Society, [1997], p.825-1002, Refs. passim. For individual papers see 51-5016 through 51-5031. For vols. 1 and 2 see 51-1322 through 51-1430.
River ice, Ice formation, Ice conditions, Freezeup, Ice breakup, Ice jams, Ice loads, Ice forecasting, Ice control

51-5016
River ice processes—state of research.
Shen, H.T., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Post-symposium proceedings. Vol.3, Beijing, Chinese Hydraulic Engineering Society, [1997], p.825-833, 59 refs.
River ice, Frazil ice, Ice formation, Freezeup, Ice growth, Ice deterioration, Ice breakup, Ice jams, Research projects

51-5017
Extreme icing in Norway 1995/1996.
Asvall, R.P., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Post-symposium proceedings. Vol.3, Beijing, Chinese Hydraulic Engineering Society, [1997], p.834-842, 1 ref.
River ice, Freezeup, Ice conditions, Frost, Naleds, Ice control, Channel stabilization, Flood control, Norway

51-5018
Anchor ice formation in gravel-bedded channels.
Hammar, L., Kerr, D.J., Shen, H.T., Liu, L.W., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Post-symposium proceedings. Vol.3, Beijing, Chinese Hydraulic Engineering Society, [1997], p.843-850, 8 refs.
River ice, Frazil ice, Bottom ice, Ice formation, Ice growth, Ice forecasting, Ice water interface, Bottom sediment, River flow

51-5019
Formation and prevention of ice hazard in winter 93 on the Inner Mongolian reach of the Yellow River.
Li, L.N., Li, Z.X., Wang, H.B., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Post-symposium proceedings. Vol.3, Beijing, Chinese Hydraulic Engineering Society, [1997], p.851-857.
River ice, Freezeup, Ice conditions, Ice jams, Accidents, Floods, Ice control, Flood control, China—Inner Mongolia, China—Yellow River

51-5020
Statistics model for ice forecast on the Ningxia-Inner Mongolia reach of the Yellow River and its application.
Li, Z.X., Tao, X., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Post-symposium proceedings. Vol.3, Beijing, Chinese Hydraulic Engineering Society, [1997], p.858-864.
River ice, Freezeup, Ice conditions, Ice breakup, Ice forecasting, Flood forecasting, Statistical analysis, China—Inner Mongolia, China—Yellow River

51-5021
Significance of river ice to environmental processes and aquatic systems.
Prowse, T.D., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Post-symposium proceedings. Vol.3, Beijing, Chinese Hydraulic Engineering Society, [1997], p.865-872, 36 refs.
River ice, Ice formation, Freezeup, Ice breakup, Ice cover effect, Environmental impact, Ecology, Research projects

51-5022
Open-water versus under-ice rating curves for suspended sediment: an example from a large northern river.
Milburn, D., Prowse, T.D., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Post-symposium proceedings. Vol.3, Beijing, Chinese Hydraulic Engineering Society, [1997], p.873-880, 22 refs.
River ice, Ice breakup, Ice jams, Ice water interface, Ice cover effect, River flow, Ice erosion, Water erosion, Suspended sediments, Sediment transport, Alluvium, Particle size distribution, Canada—Northwest Territories—Fort Simpson

51-5023

Automating observations of ice conditions for hydropower operations.

Crissman, R.D., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Post-symposium proceedings. Vol.3, Beijing, Chinese Hydraulic Engineering Society, [1997], p.881-888, 5 refs.

River ice, Ice conditions, Ice reporting, Ice forecasting, Ice detection, Ice acoustics, Underwater acoustics, Radar tracking, Monitors, Data transmission, Niagara River

51-5024

Benefit-cost evaluation of design improvements for the Lake Erie-Niagara River ice boom.

Crissman, R.D., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Post-symposium proceedings. Vol.3, Beijing, Chinese Hydraulic Engineering Society, [1997], p.889-896, 5 refs.

Lake ice, River ice, Ice control, Ice booms, Cost analysis, Erie, Lake, Niagara River

51-5025

Numerical study on ice transport in the vicinity of Niagara River hydropower intakes.

Su, J.S., Shen, H.T., Crissman, R.D., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Post-symposium proceedings. Vol.3, Beijing, Chinese Hydraulic Engineering Society, [1997], p.897-905, 9 refs.

River ice, Ice jams, Ice loads, Ice friction, Ice forecasting, Ice control, River flow, Flow control, Water intakes, Computerized simulation, Niagara River

51-5026

Sea ice engineering in the Bohai Sea.

Liu, L.M., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Post-symposium proceedings. Vol.3, Beijing, Chinese Hydraulic Engineering Society, [1997], p.906-912, 3 refs.

Offshore drilling, Offshore structures, Accidents, Petroleum industry, Economic development, Ice conditions, Ice loads, Ice control, China—Bohai Sea

51-5027

On the relationship between the physical and mechanical properties of sea ice.

Cole, D.M., MP 4059, IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Post-symposium proceedings. Vol.3, Beijing, Chinese Hydraulic Engineering Society, [1997], p.913-930, 49 refs.

Sea ice, Ice microstructure, Ice salinity, Ice cover strength, Ice loads, Ice elasticity, Ice creep, Ice deformation, Ice cracks, Ice models, Environmental tests, Research projects

This paper focuses on recent findings from laboratory and in-situ experiments that shed light on the relationship between the physical and mechanical properties of sea ice. The links between the elastic and anelastic (delayed elastic) components of strain and brine and gas porosities are examined and quantified. The elastic response is found to be a linear function of gas porosity, whereas the brine porosity has a complex influence on both the elastic and anelastic response. These effects are modeled and shown to produce predications that are in good agreement with experimental observations. The paper reviews the results of a recent program of large-scale in-situ experiments that show the significance of brine drainage structures in determining scale effects on the fracture behavior of first-year sea ice. The topics of laboratory and field testing methods and the use of constant microstructure experiments also receive attention.

51-5028

Observations of ice cracks under compression tests.

Yue, Q.J., Zheng, R.T., Bi, X.J., Huang, M.H., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Post-symposium proceedings. Vol.3, Beijing, Chinese Hydraulic Engineering Society, [1997], p.931-936, 12 refs.

Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice cracks, Ice breaking, Strain tests

51-5029

Isotropic ice flow rates derived from deformation tests in simultaneous shear and compression.

Li, J., Jacka, T.H., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Post-symposium proceedings. Vol.3, Beijing, Chinese Hydraulic Engineering Society, [1997], p.937-947, 13 refs.

Ice strength, Ice loads, Ice pressure, Ice friction, Ice creep, Ice deformation, Glacier flow, Strain tests, Environmental tests

51-5030

Investigation and field experiment of TLD technique for reduction of ice-induced vibration on the JZ20-2 MUQ jacket platform in the Bohai Sea.

Chen, X., Wang, L.Y., Sun, D.G., Zheng, C.B., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Post-symposium proceedings. Vol.3, Beijing, Chinese Hydraulic Engineering Society, [1997], p.948-955, 3 refs.

Offshore drilling, Offshore structures, Ice solid interface, Ice loads, Ice pressure, Ice friction, Ice control, Damping, China—Bohai Sea

51-5031

Numerical model of initial ice accumulation on a square cylinder.

Andersson, A., Svensson, U., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Post-symposium proceedings. Vol.3, Beijing, Chinese Hydraulic Engineering Society, [1997], p.956-964, 16 refs.

Water intakes, Hydraulic structures, Frazil ice, Ice formation, Ice accretion, Ice loads, Ice forecasting, Mathematical models

51-5032

Observations and analyses of atmospheric ozone over antarctic Zhongshan Station in the spring of 1993.

Kong, Q.X., Liu, G.G., Wang, G.C., *Chinese journal of atmospheric sciences*, 1996, 20(3), p.302-308, 9 refs.

Polar atmospheres, Polar stratospheric clouds, Ozone, Aerosols, Seasonal variations, Radio echo soundings, Profiles, Antarctica—Zhongshan Station

Electrochemical ozonesondes were used to measure the vertical profile of ozone and temperature over Zhongshan Station in the spring of 1993. The authors observed the total ozone of less than 220 Du three times. The reduction of ozone concentration began in Sep., reaching maximum from mid-Sep. to mid-Oct. The typical vertical distribution of the ozone indicates that 13-23 km above the surface is the largest range of ozone loss. This is the height range where the polar stratospheric clouds and volcanic aerosols exist. This paper presents observational results and fundamental analyses. (Auth. mod.)

51-5033

Sea ice in the North Pacific and the Kuroshio SST relation to forcing of the winter monsoon.

Fang, Z.F., Wallace, J.M., *Chinese journal of atmospheric sciences*, 1996, 20(4), p.357-363, 13 refs.

Sea ice distribution, Seasonal variations, Ice edge, Turbulent boundary layer, Precipitation (meteorology), Atmospheric circulation, Air ice water interaction, Surface temperature, Ice cover effect, Wind factors, Correlation, Pacific Ocean

51-5034

Development of high-performance amplifier of ECM-system for ice core analysis and data management.

Ohi, M., Narita, H., *Antarctic record*, Nov. 1996, 40(3), p.307-313, With Japanese summary. 2 refs.

Ice cores, Ice composition, Sampling, Electrical measurement, Electrical resistivity, Measuring instruments, Electronic equipment, Design, Data processing, Performance, Computer applications

51-5035

Quantitative reconstructions of the last glaciation of the Barents Sea: a review of ice-sheet modelling problems.

Siegert, M.J., *Progress in physical geography*, June 1997, 21(2), p.200-229, Refs. p.225-229.

Pleistocene, Ice sheets, Glaciology, Glaciation, Glacier oscillation, Climatic factors, Ice models, Marine geology, Grounded ice, Mathematical models, Geochronology, Theories, Barents Sea

51-5036

Younger Dryas research and its implications for understanding abrupt climatic change.

Anderson, D.E., *Progress in physical geography*, June 1997, 21(2), p.230-249, Refs. p.245-249.

Pleistocene, Paleoclimatology, Climatic changes, Ocean currents, Glacier melting, Meltwater, Icebergs, Ice cores, Isotope analysis, Geochronology

51-5037

Green Bay snow removal includes assisting Packers in playoffs.

Hastreiter, J., *Public works*, July 1997, 128(8), p.34-37.

Snowstorms, Snow removal, Snow removal equipment, Logistics, Cold weather performance

51-5038

Snowplow crews meet the challenge of record snowfall. *Public works*, July 1997, 128(8), p.44-45.

Road maintenance, Winter maintenance, Snowfall, Records (extremes), Snow removal, Snow removal equipment, Cold weather operation

51-5039

Anti-icing: lower the cost of safer roads. MP 5041, *Public works*, July 1997, 128(8), p.46-47, Excerpted from 50-6060.

Road maintenance, Winter maintenance, Road icing, Ice prevention, Ice control, Cold weather operation, Logistics, Manuals

51-5040

Software solution to Onondaga County snow. *Public works*, July 1997, 128(8), p.52.

Winter maintenance, Road maintenance, Snow removal, Cold weather operation, Cost analysis, Computer programs, Computer applications

51-5041

Fire and ice: winter is hell. *Public works*, July 1997, 128(8), p.53-54.

Winter maintenance, Road maintenance, Ice prevention, Ice removal, Ice melting, Solutions, Hydrocarbons, Admixtures, Environmental protection, Cold weather performance

51-5042

Chevak, Alaska benefits from new sanitation system.

Harris, B., Barnett, R., *Public works*, July 1997, 128(8), p.56-58.

Sanitary engineering, Sewage disposal, Water supply, Health, Cold weather construction, Earthwork, United States—Alaska

51-5043

Hook lifts and brine: innovative snow & ice control.

Williams, D., Lay, M., *Public works*, July 1997, 128(8), p.62-64.

Winter maintenance, Road maintenance, Ice prevention, Ice control, Salting, Brines, Vehicles, Hydraulics, Cold weather performance

51-5044

Flagellates and heliozoans in the Greenland Sea ice studied alive using light microscopy.

Ikävalko, J., Gradinger, R., *Polar biology*, June 1997, 17(6), p.473-481, Refs. p.480-481.

Sea ice, Marine biology, Microbiology, Ice composition, Algae, Plankton, Classifications, Sampling, Photography, Greenland Sea

51-5045
Arctic cyanobacteria and limnological properties of their environment: Bylot Island, Northwest Territories, Canada (73°N, 80°W).
Vézina, S., Vincent, W.F., *Polar biology,* June 1997, 17(6), p.523-534, 61 refs.
Limnology, Bacteria, Microbiology, Arctic landscapes, Ecosystems, Biomass, Radiance, Nutrient cycle, Water chemistry, Sampling, Classifications, Canada—Northwest Territories—Bylot Island

51-5046
Climatic controls of western U.S. glaciers at the last glacial maximum.
Hostetler, S.W., Clark, P.U., *Quaternary science reviews,* July 1997, 16(6), p.505-511, 45 refs.
Pleistocene, Paleoclimatology, Mountain glaciers, Glacier oscillation, Glacier mass balance, Air temperature, Cooling, Temperature effects, Simulation, Seasonal variations, United States

51-5047
Reconstruction of past climates using multi-proxy evidence: an example of the Weichselian Pleniglacial in northwest and central Europe.
Huijzer, A.S., Isarin, R.F.B., *Quaternary science reviews,* July 1997, 16(6), p.513-533, Refs. p.528-533.
Paleoclimatology, Pleistocene, Quaternary deposits, Paleoecology, Periglacial processes, Distribution, Statistical analysis, Correlation, Models, Simulation, Europe

51-5048
Last Glacial stratigraphic sequence, depositional environment and climatic fluctuations from the aeolian sand dune in Hongguang, Pengze, Jiangxi (China).
Liu, J., Wu, X.H., Li, S.Q., Zhang, M.S., *Quaternary science reviews,* July 1997, 16(6), p.535-546, 37 refs.
Pleistocene, Paleoclimatology, Climatic changes, Eolian soils, Sands, Soil formation, Stratigraphy, Stratification, Sedimentation, Grain size, Correlation, China—Jiangxi

51-5049
Diatom-inferred salinity in palaeolakes: an indirect tracer of climate change.
Gasse, F., Barker, P., Gell, P.A., Fritz, S.C., Chalié, F., *Quaternary science reviews,* July 1997, 16(6), p.547-563, Refs. p.561-563.
Paleoclimatology, Limnology, Hydrogeochemistry, Lacustrine deposits, Quaternary deposits, Stratigraphy, Paleoecology, Algae, Geochemical cycles, Classifications, Salinity, Simulation

51-5050
How long and how stable was the Last Interglacial?
Kukla, G., McManus, J.F., Rousseau, D.D., Chuine, I., *Quaternary science reviews,* July 1997, 16(6), p.605-612, 48 refs.
Pleistocene, Paleoclimatology, Climatic changes, Marine deposits, Palynology, Paleoecology, Stratigraphy, Isotope analysis, Age determination, Correlation

51-5051
Strontium 87/strontium 86 as a tracer of mineral weathering reactions and calcium sources in an alpine/subalpine watershed, Loch Vale, Colorado.
Clow, D.W., Mast, M.A., Bullen, T.D., Turk, J.T., *Water resources research,* June 1997, 33(6), p.1335-1351, Refs. p.1349-1351.
Watersheds, Tundra soils, Soil tests, Snow composition, Alpine landscapes, Hydrogeochemistry, Bedrock, Surface waters, Isotope analysis, Weathering, Solubility, United States—Colorado—Loch Vale

51-5052
Freeze-thaw durability of microwave cured air-entrained concrete.
Pheeraphan, T., Leung, C.K.Y., *Cement and concrete research,* Mar. 1997, 27(3), p.427-435, 10 refs.
Concrete durability, Concrete strength, Frost resistance, Cold weather performance, Mechanical properties, Freeze thaw tests, Air entrainment, Concrete curing, Microwaves, Heating

51-5053
Changes in zinc and cadmium concentrations in Greenland ice during the past 7760 years.
Hong, S.M., Candelone, J.P., Boutron, C.F., *Atmospheric environment,* Aug. 1997, 31(15), p.2235-2242, 53 refs.
Air pollution, Aerosols, Metals, Ice sheets, Sedimentation, Ice cores, Ice composition, Environmental tests, Ice dating, Stratigraphy, Correlation, Greenland

51-5054
Permafrost zonation and climate change in the northern hemisphere: results from transient general circulation models.
Anisimov, O.A., Nelson, F.E., *Climatic change,* Feb. 1997, 35(2), p.241-258, Refs. p.255-258.
Climatology, Permafrost distribution, Permafrost transformation, Mapping, Freezing indexes, Climatic changes, Models, Permafrost forecasting, Degradation

51-5055
Lipid distribution in surface sediments from the eastern central Arctic Ocean.
Schubert, C.J., Stein, R., *Marine geology,* Apr. 1997, 138(1-2), p.11-25, Refs. p.23-25.
Marine biology, Oceanographic surveys, Biomass, Bottom sediment, Hydrocarbons, Hydrogeochemistry, Drill core analysis, Organic nuclei, Sampling, Ice cover effect, Distribution, Origin, Arctic Ocean

51-5056
Geochemical constraints on the formation of Late Cenozoic ferromanganese micronodules from the central Arctic Ocean.
Winter, B.L., Johnson, C.M., Clark, D.L., *Marine geology,* Apr. 1997, 138(1-2), p.149-169, Refs. p.167-169.
Pleistocene, Marine geology, Sea water, Water chemistry, Geochemistry, Geochemical cycles, Sedimentation, Stratigraphy, Bottom sediment, Minerals, Drill core analysis, Isotope analysis, Arctic Ocean

51-5057
Polar mesocyclones. [Polare Mesozyklonen]
Heinemann, G., *Bonner meteorologische Abhandlungen,* 1995, Vol.45, 156p., In German with English summary. Refs. p.147-156.
DLC QC851.B64 Heft 45
Atmospheric circulation, Atmospheric disturbances, Sea ice, Polynyas, Antarctica—Weddell Sea
Meso-scale cyclones with small spatial and temporal scales occur poleward of the main polar front. These "polar mesocyclones" or "polar lows" may have a large impact on local weather conditions and may be of vital importance for human activities in polar regions. The main concern of the present study is to contribute to the understanding of the development and the structures of polar mesocyclones. The point of main effort lies on investigations of mesocyclones in the Weddell Sea area. Results from studies for different regions in the Antarctic and in the Arctic are compared to the results of the present study in relation to the entirety of polar mesocyclones in both hemispheres. Insights into the complex processes for the development of these mesocyclones were obtained by climatological studies during the antarctic summer and winter and by the aircraft-based experiment AMES during the austral summer 1989-90. (Auth. mod.)

51-5058
Seasonal and spatial variations in the water mass characteristics of Muir Inlet, Glacier Bay, Alaska.
Quinlan, A.V., College, University of Alaska, 1970, 145p., M.S. thesis. 49 refs.
Oceanographic surveys, Marine geology, Glacial geology, Estuaries, Meltwater, Sea water, Water temperature, Salinity, Water chemistry, Water transport, United States—Alaska—Glacier Bay

51-5059
Domestic heating and thermal insulation. *Building Research Station, Garston, Watford, Hertfordshire, England. Digest,* Apr. 1960, No.133, 7p., 6 refs.
Houses, Heating, Thermal insulation, Ventilation, Cost analysis

51-5060
Working in winter or bad weather. *Building Research Station, Garston, Watford, Hertfordshire, England. Digest (second series),* 1960, No.3, 4p.
Cold weather construction, Cold weather operation, Winter concreting, Labor factors

51-5061
Evaluation of potential sources of riprap and armor stone—methods and considerations.
Lienhart, D.A., Stransky, T.E., *Association of Engineering Geologists. Bulletin,* 1981, 18(3), p.323-332, 13 refs.
Quarries, Blasting, Rock excavation, Rock fills, Rock mechanics, Lithology, Bank protection (waterways), Slope protection, Soil stabilization

51-5062
North Siberian lakes: a methane source fueled by Pleistocene carbon.
Zimov, S.A., et al, *Science,* Aug. 8, 1997, 277(5327), p.800-802, 31 refs.
Lake ice, Atmospheric composition, Russia—Siberia

51-5063
Europa's differentiated internal structure: inferences from two Galileo encounters.
Anderson, J.D., Lau, E.L., Sjogren, W.L., Schubert, G., Moore, W.B., *Science,* May 23, 1997, 276(5316), p.1236-1239, 14 refs.
Satellites (natural), Geologic structures, Extraterrestrial ice, Ice detection, Stratification, Spacecraft, Radar echoes, Models

51-5064
Polarization-enhanced NMR spectroscopy of biomolecules in frozen solution.
Hall, D.A., et al, *Science,* May 9, 1997, 276(5314), p.930-932, 30 refs.
Ice physics, Frozen liquids, Nuclear magnetic resonance, Ice spectroscopy, Molecular structure, Polarization (charge separation), Resolution, Laboratory techniques

51-5065
Ocean emerges on Europa.
Kerr, R.A., *Science,* Apr. 18, 1997, 276(5311), p.355.
Extraterrestrial ice, Satellites (natural), Spaceborne photography, Ice detection, Regolith, Ice mechanics

51-5066
Monitoring a killer volcano through clouds and ice.
Clery, D., *Science,* June 27, 1997, 276(5321), p.1985.
Volcanoes, Spaceborne photography, Synthetic aperture radar, Glacier melting, Magma, Flood forecasting, Image processing, Iceland

51-5067
Oxygen on Ganymede: laboratory studies.
Vidal, R.A., Bahr, D., Baragiola, R.A., Peters, M., *Science,* June 20, 1997, 276(5320), p.1839-1842, 36 refs.
Extraterrestrial ice, Satellites (natural), Ground ice, Amorphous ice, Ice composition, Ice spectroscopy, Oxygen, Radiation absorption, Spectra, Haze, Simulation

51-5068
Seasonal variation of turbulent energy dissipation rates at high latitudes as determined by in situ measurements of neutral density fluctuations.
Lübken, F.J., *Journal of geophysical research,* June 27, 1997, 102(D12), p.13,441-13,456, 49 refs.
Polar atmospheres, Atmospheric physics, Profiles, Turbulent boundary layer, Heating, Sounding, Atmospheric density, Spectra, Turbulent exchange, Seasonal variations

51-5069
Tracer lamination of the stratosphere: a global climatology.
Appenzeller, C., Holton, J.R., *Journal of geophysical research,* June 27, 1997, 102(D12), p.13,555-13,569, 39 refs.
Climatology, Polar atmospheres, Atmospheric composition, Stratosphere, Ozone, Stratification, Seasonal variations, Sounding
Vertical soundings of stratospheric ozone often exhibit laminated tracer structures characterized by strong vertical tracer gradients. The change in time of these gradients is used to define a tracer lamination rate. It is shown that this quantity can be calculated by the cross product of the horizontal temperature and horizontal tracer gradients. A climatology based on satellite-borne ozone data and on ozone-like pseudotracer data is presented. Three stratospheric regions with high lamination rates were found: the part of the stratospheric overworld which is influenced by the polar vortex, the part of the lowermost stratosphere which is influenced by the tropopause

and a third region in the subtropical lower stratosphere mainly characterized with strong vertical shear. During winter, high lamination rates associated with the stratospheric polar vortex are present down to ca. 100 hPa. The patterns in the southern and northern hemisphere are comparable, but details differ as anticipated from a less disturbed and more symmetric antarctic vortex. (Auth. mod.)

51-5070

Study of composite cirrus morphology using data from a 94-GHz radar and correlations with temperature and large-scale vertical motion.

Mace, G.G., Ackerman, T.P., Clothiaux, E.E., Albrecht, B.A., *Journal of geophysical research,* June 27, 1997, 102(D12), p.13,581-3,593, 34 refs.

Clouds (meteorology), Cloud cover, Climatic factors, Cloud physics, Structural analysis, Radar echoes, Reflectivity, Ice crystals, Ice detection, Air temperature, Classifications

51-5071

Radiation field in a multilayered geophysical medium: ice-water-aerosol-vegetation-soil (IWAVES) model.

Iaquinta, J., Pinty, B., *Journal of geophysical research,* June 27, 1997, 102(D12), p.13,627-13,642, 41 refs.

Geophysical surveys, Remote sensing, Cloud physics, Optical properties, Ice crystal structure, Albedo, Radiation balance, Aerosols, Radiance, Reflectivity, Forest canopy, Models

51-5072

Techniques for analyzing lead condition in visible, infrared and microwave satellite imagery.

Fett, R.W., Englebretson, R.E., Burk, S.D., *Journal of geophysical research,* June 27, 1997, 102(D12), p.13,657-13,671, 29 refs.

Oceanography, Sea ice distribution, Ice openings, Polynyas, Detection, Radiometry, Spaceborne photography, Infrared reconnaissance, Microwaves, Image processing, Correlation

51-5073

Studies of the antarctic climate with a stretched-grid general circulation model.

Krinner, G., Genthon, C., Li, Z.X., Le Van, P., *Journal of geophysical research,* June 27, 1997, 102(D12), p.13,731-13,745, 50 refs.

Climatology, Polar atmospheres, Turbulent boundary layer, Atmospheric circulation, Surface temperature, Wind direction, Snow accumulation, Topographic effects, Temperature inversions, Simulation

A stretched-grid general circulation model is used for a multiyear high-resolution simulation of the antarctic climate. The resolution in the antarctic region reaches 100 km. The simulated antarctic climate is significantly better in the stretched-grid simulation than in the regular-grid control run. The katabatic wind regime is well captured, although the winds may be too weak. The annual snow accumulation is close to the observed values. The model correctly simulates the atmospheric dynamics of the rest of the globe. (Auth. mod.)

51-5074

Combined global climate model and mesoscale model simulations of antarctic climate.

Hines, K.M., Bromwich, D.H., Liu, Z., *Journal of geophysical research,* June 27, 1997, 102(D12), p.13,747-13,760, 35 refs.

Climatology, Polar atmospheres, Glacial meteorology, Atmospheric pressure, Atmospheric boundary layer, Moisture transfer, Wind direction, Computerized simulation

Simulations of antarctic latitudes with a high-resolution mesoscale model examine the impact of a moist physics parameterization and the success of a one-way nesting inside a global climate model. The nested simulation is sensitive to the forcing at the horizontal boundaries. Consequently, proper location of troughs and ridges at the boundaries is required for the model to well represent all the major troughs and ridges inside the domain. The addition of moist physics to the mesoscale simulations tends to improve the quality of the simulated fields over the southern ocean. In particular, the intensity of the circumpolar trough is increased. Over Antarctica, serious deficiencies are found in the simulations with moist physics. Excessive moisture is apparently stored in the simulated clouds leading to excessive atmospheric back radiation and, consequently, excessive temperatures at the surface and higher up in the troposphere. (Auth. mod.)

51-5075

Validation of operational numerical analyses in antarctic latitudes.

Cullather, R.I., Bromwich, D.H., Grumbine, R.W., *Journal of geophysical research,* June 27, 1997, 102(D12), p.13,761-13,784, 43 refs.

Climatology, Polar atmospheres, Atmospheric boundary layer, Weather forecasting, Surface temperature, Radio echo soundings, Classifications, Weather stations, Wind direction, Seasonal variations, Correlation, Accuracy, Mathematical models

Available rawinsonde, automatic weather station (AWS), ship, and synthesized long-term observations are used to evaluate the antarctic numerical analyses of the European Centre for Medium-Range Weather Forecasts (ECMWF) and the U.S. National Centers for Environmental Prediction (NCEP) from 1985 to 1994. Twice-daily variations in the ECMWF surface pressure analyses compare closely with AWS units of the U.S. Antarctic Program and ship observations. The NCEP analyses over the same period show substantial improvement, particularly during the period 1985-1990. Surface air temperatures and winds do not agree so closely, which may result from analyses error, the localized nature of the fields, or a combination. Results presented here indicate that a large amount of the available data is being incorporated and that large deficiencies identified in previous studies are being addressed, although areas of concern remain. In particular, grid values corresponding to individual stations including the now-closed Leningradskaya base and Mirnyy are found to be conspicuously deficient at the 200 hPa level for both analyses. (Auth. mod.)

51-5076

On the forcing of seasonal changes in surface pressure over Antarctica.

Parish, T.R., Bromwich, D.H., *Journal of geophysical research,* June 27, 1997, 102(D12), p.13,785-13,792, 32 refs.

Climatology, Polar atmospheres, Atmospheric boundary layer, Turbulent boundary layer, Atmospheric pressure, Wind velocity, Topographic effects, Seasonal variations, Mass transfer

A 10-year record (1985-1994) of output statistics from the European Centre for Medium-Range Weather Forecasts model shows that profound seasonal changes in surface pressure take place over the antarctic continent. The large seasonal changes in solar insolation reaching the antarctic ice surface modulate the intensity of the katabatic wind regime and thus the resulting mean meridional circulation between the continent and the subpolar latitudes. It is proposed that the diabatic adjustment in the lower levels of the atmosphere over Antarctica disrupts the mean meridional circulation creating a seasonal mass imbalance and hence surface pressure changes. The seasonal mass movement over Antarctica requires large-scale mass compensation over much of the Southern Hemisphere and shows that the diabatic influences at the antarctic surface have far-field impacts. (Auth. mod.)

51-5077

Abrupt spring air temperature rise over the Greenland ice cap.

Rogers, J.C., Hellstrom, R.A., Mosley-Thompson, E., Wang, C.C., *Journal of geophysical research,* June 27, 1997, 102(D12), p.13,793-13,800, 8 refs.

Climatology, Climatic changes, Glacial meteorology, Ice sheets, Ice air interface, Atmospheric boundary layer, Surface temperature, Temperature variations, Temperature measurement, Seasonal variations, Ice cover effect, Greenland

51-5078

Atmospheric circulation around the Greenland Crest.

Stearns, C.R., Weidner, G.A., Keller, L.M., *Journal of geophysical research,* June 27, 1997, 102(D12), p.13,801-13,812, 19 refs.

Climatology, Polar atmospheres, Ice sheets, Ice air interface, Atmospheric boundary layer, Atmospheric circulation, Wind velocity, Wind direction, Topographic effects, Seasonal variations, Weather stations, Greenland

51-5079

Air-snow interactions and the surface energy and mass balance over the melting zone of West Greenland during the Greenland Ice Margin Experiment.

Gallée, H., Duynkerke, P.G., *Journal of geophysical research,* June 27, 1997, 102(D12), p.13,813-13,824, 33 refs.

Climatology, Synoptic meteorology, Atmospheric boundary layer, Ice sheets, Glacier mass balance, Snow air interface, Snowmelt, Snow heat flux, Regelation, Surface energy, Ice cover effect, Mathematical models, Greenland

51-5080

Idealized simulations of the antarctic katabatic wind system with a three-dimensional mesoscale model.

Heinemann, G., *Journal of geophysical research,* June 27, 1997, 102(D12), p.13,825-13,834, 23 refs.

Climatology, Polar atmospheres, Atmospheric boundary layer, Atmospheric circulation, Wind velocity, Wind direction, Ice air interface, Ice cover effect, Topographic effects, Diurnal variations, Simulation, Mathematical models

The katabatic wind system represents a key factor for the near-surface wind field of the antarctic region. Idealized simulations with a three-dimensional mesoscale model are performed to investigate the development of the antarctic katabatic wind system and its sensitivity to physical boundary conditions, in particular channeling effects and the thermodynamic forcing close to the coastline. The simulated cases represent wintertime cases with complete sea ice coverage and no sea ice, as well as a realistic summertime situation. The formation of shallow mesoscale circulations is simulated after 2-4 days of simulation in ice-free coastal areas. In these regions, low-level convergence, diabatic heating, and the cold air advection associated with the katabatic flow leads to low-level baroclinicity and cyclonic vorticity production. (Auth. mod.)

51-5081

Air-sea interactions over Terra Nova Bay during winter: simulation with a coupled atmosphere-polynya model.

Gallée, H., *Journal of geophysical research,* June 27, 1997, 102(D12), p.13,835-13,849, Refs. p.13,848-13,849.

Polar atmospheres, Marine atmospheres, Turbulent boundary layer, Atmospheric circulation, Air ice water interaction, Polynyas, Frazil ice, Heat flux, Mathematical models, Simulation, Antarctica—Terra Nova Bay

A preliminary simulation of the Terra Nova Bay polynya has been performed with a coupled atmosphere-polynya model. The atmospheric model is a hydrostatic primitive equations model that has been validated previously by a simulation of the strong katabatic winds observed in that area. The polynya model includes a representation of the free drift of frazil ice and simple sea-ice dynamics and thermodynamics. Two-dimensional experiments show that an open (warm) water area influences significantly the atmospheric circulation in the antarctic coastal zone: an additional ice-breeze effect is simulated and is responsible for the strengthening of the katabatic winds near the coast. Because of the important temperature difference between the continental air and the ice-free ocean (up to 40°C), strong surface heat fluxes are simulated over the polynya. Finally, a three-dimensional experiment has been performed. The integration domain includes Terra Nova Bay. The polynyas observed are stronger than previously thought but are probably constrained by the idealized representation of frazil ice, which is assumed to be uniform in each grid box. (Auth. mod.)

51-5082

Evolution of the cloudy boundary layer during the autumnal freezing of the Beaufort Sea.

Curry, J.A., Pinto, J.O., Benner, T., Tschudi, M., *Journal of geophysical research,* June 27, 1997, 102(D12), p.13,851-13,860, 22 refs.

Climatology, Polar atmospheres, Atmospheric boundary layer, Sounding, Aerial surveys, Cloud cover, Air temperature, Profiles, Radiation balance, Atmospheric boundary layer, Sea ice distribution, Sea water freezing, Air ice water interaction, Beaufort Sea

51-5083

Role of radiative transfer in the modeled mesoscale development of summertime arctic stratus.

Pinto, J.O., Curry, J.A., *Journal of geophysical research,* June 27, 1997, 102(D12), p.13,861-13,872, 46 refs.

Climatology, Polar atmospheres, Atmospheric boundary layer, Cloud cover, Cloud physics, Radiation balance, Cooling, Profiles, Models, Simulation, Seasonal variations

51-5084

Surface wind fields of antarctic mesocyclones derived from ERS 1 scatterometer data.

Marshall, G.J., Turner, J., *Journal of geophysical research,* June 27, 1997, 102(D12), p.13,907-13,921, 49 refs.

Polar atmospheres, Marine atmospheres, Climatology, Atmospheric circulation, Wind direction, Spaceborne photography

The effectiveness of ERS 1 scatterometer data as a tool for studying the wind fields of antarctic mesocyclones is analyzed by using 1 year's observations of these systems derived from satellite imagery encompassing the Antarctic Peninsula and Bellingshausen and Wed-

dell Seas. It is shown that the scatterometer processing scheme utilized can affect the resultant wind fields, particularly the accuracy of the external forecast winds used for "meteorological ambiguity removal." Very few of the mesocyclones (9%) were "captured" by the scatterometer data because ca. 60% of the vortices did not form over the open ocean, and because the narrow scatterometer swath results in a poor temporal resolution unfit for the small-sized, short-lived antarctic mesocyclones. The scatterometer wind field data represent an important new tool for studying antarctic mesocyclones but need to be used in conjunction with sensors having a higher frequency of coverage to allow multitemporal analyses of such systems throughout their development. (Auth. mod.)

51-5085

Mesoscale cyclone activity over Antarctica during 1991. 1. Marie Byrd Land.

Carrasco, J.F., Bromwich, D.H., Liu, Z., *Journal of geophysical research,* June 27, 1997, 102(D12), p.13,923-13,937, 33 refs.

Climatology, Polar atmospheres, Atmospheric circulation, Advection, Cloud cover, Spaceborne photography, Seasonal variations, Antarctica—Marie Byrd Land

A 1-year statistical study of mesoscale cyclonic activity indicates that, on average, one or two mesoscale cyclones can be observed each week over the southernmost part of Marie Byrd Land, where cold katabatic winds from the high plateau of East Antarctica and relatively warm katabatic airflows from West Antarctica interact. The 1991 annual mesoscale cyclone behavior exhibits maximum activity in Mar. and minimum in Sep. Analysis of the large-scale pattern for these months suggests that the higher activity in Mar. is associated with synoptic-scale conditions that support the cold katabatic drainage from East Antarctica and favor warm air advection into West Antarctica. More than half (70%) of the mesoscale vortices observed near Siple Coast were of comma cloud type with an average diameter of about 250 km. The satellite signature characteristics show that these cyclonic perturbations were stratiform low cloud features, indicating that most developed within the lower troposphere. (Auth. mod.)

51-5086

Mesoscale cyclone activity over Antarctica during 1991. 2. Near the Antarctic Peninsula.

Carrasco, J.F., Bromwich, D.H., Liu, Z., *Journal of geophysical research,* June 27, 1997, 102(D12), p.13,939-13,954, 33 refs.

Climatology, Polar atmospheres, Marine atmospheres, Atmospheric boundary layer, Atmospheric circulation, Cloud cover, Spaceborne photography, Seasonal variations, Antarctica—Bellingshausen Sea, Antarctica—Weddell Sea

In a survey of mesoscale cyclogenesis near the Antarctic Peninsula carried out for 1991, a slightly higher cyclonic activity was found over the Bellingshausen Sea than over the Weddell Sea. Both sides were characterized by a pronounced formation maximum in summer and a minimum in winter. Comma clouds were the dominant vortex type. The fraction of mesoscale cyclones with middle and/or high cloud on the west side of the Antarctic Peninsula was much higher than on the east side. These numerous and deep mesoscale cyclones are a consequence of the frequent outbreaks of cold air associated with synoptic-scale cyclones that move cold air northward over the relatively warm Bellingshausen Sea. This happens less often in the Weddell Sea area, where low-level baroclinic instability and vortex stretching are the dominant formation mechanisms, and air-sea interaction is usually much less vigorous. (Auth. mod.)

51-5087

Early-autumn polar low formation over the Norwegian Sea.

Nielsen, N.W., *Journal of geophysical research,* June 27, 1997, 102(D12), p.13,955-13,973, 29 refs.

Climatology, Marine atmospheres, Polar atmospheres, Fronts (meteorology), Cloud cover, Turbulent boundary layer, Atmospheric pressure, Air water interactions, Spaceborne photography, Weather forecasting, Mathematical models, Norwegian Sea

51-5088

Synoptic and mesoscale atmospheric features over the ice-covered portion of the Fram Strait in spring.

Rasmussen, E.A., Guest, P.S., Davidson, K.L., *Journal of geophysical research,* June 27, 1997, 102(D12), p.13,975-13,986, 26 refs.

Climatology, Marine meteorology, Synoptic meteorology, Atmospheric disturbances, Fronts (meteorology), Advection, Gravity waves, Pack ice, Drift, Air ice water interaction, Ice cover effect, Seasonal variations, Fram Strait

51-5089

Precipitation characteristics in Greenland-Iceland-Norwegian Seas determined by using satellite microwave data.

Liu, G.S., Curry, J.A., *Journal of geophysical research,* June 27, 1997, 102(D12), p.13,987-13,997, 27 refs.

Climatology, Marine meteorology, Precipitation (meteorology), Synoptic meteorology, Snowfall, Spacecraft, Radiometry, Weather forecasting, Simulation, Greenland Sea, Iceland Sea, Norwegian Sea

51-5090

Variability of precipitation over the coastal western Antarctic Peninsula from synoptic observations.

Turner, J., Colwell, S.R., Harangozo, S., *Journal of geophysical research,* June 27, 1997, 102(D12), p.13,999-14,007, 23 refs.

Precipitation (meteorology), Marine meteorology, Atmospheric circulation, Synoptic meteorology, Seasonal variations, Sea ice distribution, Ice cover effect, Statistical analysis, Antarctica—Antarctic Peninsula

Observations of precipitation events at Faraday and Rothera Stations are analyzed to investigate the spatial and temporal variability of precipitation along the western coastal (Pacific) side of the Antarctic Peninsula. The record of observations made at Faraday since 1956 shows a statistically significant increase in the number of winter-season precipitation events. The semiannual cycle in the latitudinal location and depth and position of the circumpolar trough is reproduced in the record of precipitation events at both Faraday and Rothera. It is argued that the systematic increase in the number of precipitation events at Faraday since the 1950s is associated with changes in the depression tracks across the Bellingshausen Sea, with an increase in the number of depressions approaching from outside the Antarctic rather than from the west. (Auth. mod.)

51-5091

Synthesis of warm air advection to the South Polar Plateau.

Hogan, A.W., MP 4060, *Journal of geophysical research,* June 27, 1997, 102(D12), p.14,009-14,020, 47 refs.

Climatology, Polar atmospheres, Synoptic meteorology, Atmospheric boundary layer, Surface temperature, Snow temperature, Atmospheric circulation, Wind direction, Aerosols, Advection, Antarctica—Howe, Mount

Surface temperature and wind chronologies of varying length and 10 m snow temperatures have been used to produce a synthesis of airflow into Antarctica. This synthesis shows relatively warm air over Ellsworth Land, which appears to enter the South Polar Plateau through a slightly lower-lying trough between the summit of the Transantarctic Mountains and the Polar Plateau. Comparison of recent automatic weather station (AWS) records from Mount Howe with four AWS surrounding South Pole at 89°S show that this upslope inflow is a frequent and persistent phenomenon. (Auth.)

51-5092

Occurrence frequency of thickness of annual snow accumulation layers at South Pole.

Hogan, A.W., Gow, A.J., MP 4061, *Journal of geophysical research,* June 27, 1997, 102(D12), p.14,021-14,027, 34 refs.

Climatology, Precipitation (meteorology), Snow accumulation, Snow stratigraphy, Layers, Thickness, Aerosols, Statistical analysis, Periodic variations, Metamorphism (snow), Age determination, Antarctica—Amundsen-Scott Station

Analysis of 2,000 annual snow accumulation layers at the South Pole is applied to objective extraction of meteorological parameters from the Amundsen-Scott Station accumulation record. The authors have compared the 100-year "snow mine" accumulation record of Giovinetto and Schwerdtfeger and a 2000-layer pit and core record obtained in 1982. Frequency analysis of the number of occurrences of layers with respect to thickness or mass of the layer showed the logarithms of thickness or mass to be normally distributed. The snow accumulation and marine aerosol (sodium) accumulation in recent annual layers with the station meteorological record and the surface aerosol record may be transformable to provide an index of this meridional transport. It is proposed that the magnitude of snow accumulation, with respect to frequency of that accumulation, provides an objective criterion for comparing individual years of meteorological history and that the geometric standard deviation of accumulation provides an objective index for estimation of climatic fluctuation during the period of accumulation. (Auth. mod.)

51-5093

Synoptic flow and density observations near an Arctic shelf break.

Münchow, A., Carmack, E.C., *Journal of physical oceanography,* July 1997, 27(7), p.1402-1419, 45 refs.

Oceanography, Ocean currents, Hydrography, Water transport, Velocity measurement, Ventilation, Shear flow, Topographic effects, Profiles, Density (mass/volume), Arctic Ocean

51-5094

Optical properties of deep ice at the South Pole: absorption.

AMANDA Collaboration, *Applied optics,* June 20, 1997, 36(18), p.4168-4180, 28 refs.

Ice sheets, Optical properties, Lasers, Radiation absorption, Impurities, Dust, Refractivity, Gamma irradiation, Statistical analysis

The authors discuss recent measurements of the wavelength-dependent absorption coefficients in deep South Pole ice. The method uses transit-time distributions of pulses from a variable-frequency laser sent between emitters and receivers embedded in the ice. At depths of 800-1000 m scattering is dominated by residual air bubbles, whereas absorption occurs both in ice itself and in insoluble impurities. The absorption coefficient increases approximately exponentially with wavelength in the measured interval 410-610 nm. At ca. 415 to ca. 500 nm the experimental uncertainties are small enough to resolve an extrinsic contribution to absorption in ice: submicrometer dust particles contribute by an amount that increases with depth and corresponds well with the expected increase seen near the Last Glacial Maximum in Vostok and Dome C ice cores. The laser pulse method allows remote mapping of gross structure in dust concentration as a function of depth in glacial ice. (Auth. mod.)

51-5095

Optical properties of deep ice at the South Pole: scattering.

Price, P.B., Bergström, L., *Applied optics,* June 20, 1997, 36(18), p.4181-4194, 54 refs.

Ice sheets, Ice optics, Optical properties, Turbidity, Impurities, Defects, Dust, Lasers, Light scattering, Ice crystal structure, Analysis (mathematics)

Recently, absorption and scattering at depths of 800-1000 m in South Pole ice have been studied with transit-time distributions of pulses from a variable-frequency laser sent between emitters and receivers embedded in the ice. At 800-1000 m, scattering is independent of wavelength and the scattering centers are air bubbles of size >> wavelength. At 1500-2000 m it is predicted that all bubbles will have transformed into air-hydrate clathrate crystals and that scattering occurs primarily at dust grains, at liquid acids concentrated along three-crystal boundaries, and at salt grains. Scattering from dust grains should show peaks at depths of ca. 1050, 1750 and 2200 m in South Pole ice. If marine salt grains remain undissolved, they will scatter like insoluble dust grains. Refraction at ice-ice boundaries and at hydrate-ice boundaries is manifested by a multitude of small-angle scatters, independent of wavelength. The largest contribution to Rayleigh-like scattering is likely due to dislocations decorated discontinuously with impurities. (Auth. mod.)

51-5096

Optical properties of contrail-induced cirrus: discussion of unusual halo phenomena.

Sussmann, R., *Applied optics,* June 20, 1997, 36(18), p.4195-4201, 47 refs.

Cloud physics, Optical properties, Ice crystal optics, Ice crystal structure, Orientation, Humidity, Light scattering, Optical phenomena, Condensation trails, Photointerpretation

51-5097

Photogrammetry as a research tool for glaciology.

Fox, A.J., Nuttall, A.M., *Photogrammetric record,* Apr. 1997, 15(89), p.725-737, With French and German summaries. 15 refs.

Glaciology, Glacier surveys, Glacier surges, Stereophotography, Photogrammetry, Sensor mapping, Profiles, Topographic features, Altitude, Accuracy, Correlation

51-5098

Relation between active layer depth and a spectral vegetation index in arctic tundra landscapes of the North Slope of Alaska.

McMichael, C.E., Hope, A.S., Stow, D.A., Fleming, J.B., *International journal of remote sensing,* July 20, 1997, 18(11), p.2371-2382, 31 refs.

Subarctic landscapes, Tundra terrain, Tundra vegetation, Active layer, Thaw depth, Vegetation patterns, Permafrost surveys, Remote sensing, Radiometry, Spectra, Topographic effects, Statistical analysis, United States—Alaska—North Slope

51-5099

Cluster model explaining quantitatively the anomalous variation of density of water with temperature.

Khan, A., Khan, R., Khan, M.F., Khanam, F., *Chemical physics letters,* Mar. 7, 1997, 266(5-6), p.473-480, 34 refs.

Water structure, Molecular structure, Hydrogen bonds, Thermodynamic properties, Water temperature, Density (mass/volume), Temperature effects, Models, Thermal expansion

51-5100

Temperature and salt content regimes in three shallow ice-covered lakes. 1. Temperature, salt content, and density structure.

Malm, J., et al, *Nordic hydrology,* 1997, 28(2), p.99-128, 24 refs.

Limnology, Icebound lakes, Subglacial observations, Temperature measurement, Salinity, Ice water interface, Ice cover effect, Thermal regime, Profiles, Water temperature, Stratification, Convection, Seasonal variations

51-5101

Temperature and salt content regimes in three shallow ice-covered lakes. 2. Heat and mass fluxes.

Malm, J., et al, *Nordic hydrology,* 1997, 28(2), p.129-152, 35 refs.

Limnology, Icebound lakes, Subglacial observations, Heat flux, Mass transfer, Ice water interface, Salinity, Bottom sediment, Albedo

51-5102

Frost growth around a cylinder in a wet air stream.

Ismail, K.A.R., Salinas, C., Gonçalves, M.M., *International journal of refrigeration,* Mar. 1997, 20(2), p.106-119, With French summary. 24 refs.

Refrigeration, Frost, Ice formation, Surface temperature, Pipes (tubes), Ice air interface, Air flow, Laminar flow, Mathematical models, Heat transfer coefficient, Humidity

51-5103

Liquid water in the domain of cubic crystalline ice I_c.

Jenniskens, P., Banham, S.F., Blake, D.F., McCoustra, M.R.S., *Journal of chemical physics,* July 22, 1997, 107(4), p.1232-1241, 46 refs.

Ice physics, Scanning electron microscopy, Water films, Water structure, Ice water interface, Heating, Phase transformations, Viscosity, Radiation absorption, Extraterrestrial ice

51-5104

Study of frost events in areas characterised by the absence of observations.

Kassomenos, P., Flocas, H.A., Lykoudis, S., Petrakis, M., *Meteorology and atmospheric physics,* 1997, 62(3-4), p.249-256, 9 refs.

Agriculture, Frost, Radiant cooling, Atmospheric boundary layer, Air temperature, Temperature inversions, Wind factors, Profiles, Diurnal variations, Topographic effects, Synoptic meteorology, Simulation, Mathematical models

51-5105

Wave processes and ozone over the Antarctic. [Volnovye protsessy i ozon nad Antarktikoĭ]

Bugaeva, I.V., Butko, A.I., Tarasenko, D.A., *Antarktika,* 1995, No.33, p.5-14, In Russian with English summary. 11 refs.

Ozone, Atmospheric circulation, Atmospheric disturbances, Periodic variations, Stratosphere, Wind, Antarctica

Data on total ozone over the Antarctic in spring of 1991 are presented. The data are compared to specific features of the thermodynamic parameters of the atmosphere obtained using meteorological rockets and satellites. Wave processes in the spring of 1991 are analyzed. Deviations of the zonal wave-numbers n=1 and n=2 from the model values are demonstrated. The authors conclude that the position and intensity of the polar vortex play a significant role in interannual variations in the ozone layer observed over Antarctica. (Auth. mod.)

51-5106

Evaluation of the role of dynamic interactions between the lower and middle atmospheres in stratospheric and mesospheric temperatures and circulation variations over Molodezhnaya Station during the 1982-1990 winter and spring seasons. [Otsenka roli dinamicheskogo vzaimodeĭstviia mezhdu nizhneĭ i sredneĭ atmosferoĭ v izmeneniiakh temperatury i tsirkuliatsii v stratosfere i mezosfere nad st. Molodezhnaia v zimnie i vesennie sezony 1982-1990 gg.]

Kidiiarova, V.G., Fomina, N.N., *Antarktika,* 1995, No.33, p.15-18, In Russian with English summary. 5 refs.

Atmospheric circulation, Temperature variations, Atmospheric disturbances, Heat transfer, Stratosphere, Wind, Antarctica—Molodezhnaya Station

On the basis of winter and spring rocket observation data over Molodezhnaya Station for 1982-1990, the connections between temperatures and zonal wind variations for different layers of the stratosphere and mesosphere are evaluated. The propagation of planetary waves and energy exchanges between the layers are also investigated. Refraction coefficient calculations are used to analyze the conditions for planetary wave propagation. The authors show that when westward circulation is highly intense, energy from planetary waves is transferred to the antarctic stratosphere and/or mesosphere causing a corresponding warming of these regions of the atmosphere. (Auth. mod.)

51-5107

Comparison of ERS-1 AMI wind scatterometer and SSM/I sea ice detection in the Baltic Sea.

Grandell, J., Johannessen, J.A., Hallikainen, M., *Photogrammetric journal of Finland,* 1996, 15(1), p.6-23, 19 refs.

Oceanography, Sea ice distribution, Spaceborne photography, Ice surveys, Radiometry, Radar echoes, Backscattering, Ice detection, Classifications, Image processing, Correlation, Resolution, Baltic Sea

51-5108

Airborne gamma-ray spectrometric data enhanced by image processing methods in gold exploration in the Kuusamo area, northeastern Finland.

Arkimaa, H., *Photogrammetric journal of Finland,* 1996, 15(1), p.24-29, 12 refs.

Subarctic landscapes, Geological surveys, Bedrock, Sediments, Sensor mapping, Electromagnetic prospecting, Imaging, Gold, Gamma irradiation, Image processing, Finland

51-5109

Statistical approach to formulating deep freeze HMAs.

Honiball, W.J., Lebez, J., Simons, J.C., van Rign, K., *Adhesives age,* May 1997, 40(5), p.18-26, 11 refs.

Polymers, Adhesion, Thermal analysis, Chemical composition, Low temperature tests, Performance, Rheology, Plastic properties, Brittleness, Temperature measurement, Statistical analysis

51-5110

Stratigraphy and paleomagnetism of the lava pile south of Ísfjardardjúp, NW- Iceland.

Kristjánsson, L., Jóhannesson, H., *Jökull,* 1994, No.44, p.3-16, With Icelandic summary. 24 refs.

Arctic landscapes, Geological surveys, Pleistocene, Magma, Stratigraphy, Profiles, Geomagnetism, Orientation, Polarization (charge separation), Remanent magnetism, Sedimentation, Geochronology, Iceland—Ísafjardardjúp

51-5111

First epoch GPS survey of the Hengill triple junction, SW Iceland, and the effect of ocean loading.

Hodgkinson, K.M., Foulger, G.R., *Jökull,* 1994, No.44, p.17-27, With Icelandic summary. 27 refs.

Marine geology, Earth crust, Geodetic surveys, Spacecraft, Tectonics, Ocean bottom, Tides, Deformation, Loading, Statistical analysis, Iceland

51-5112

Experiment in glacio-isostasy near Vatnajökull, Iceland.

Einarsson, P., Sigmundsson, F., Hofton, M.A., Foulger, G.R., Jacoby, W., *Jökull,* 1994, No.44, p.29-39, With Icelandic summary. 23 refs.

Glacial geology, Subarctic landscapes, Isostasy, Earth crust, Geodetic surveys, Gravity, Viscosity, Simulation, Iceland—Vatnajökull

51-5113

Image analysis and morphometry of hydromagmatic and magmatic tephra grains, Reykjanes volcanic system, Iceland.

Eiríksson, J., Sigurgeirsson, M.Á., Hoelstad, T., *Jökull,* 1994, No.44, p.41-55, With Icelandic summary. 23 refs.

Subarctic landscapes, Geological surveys, Volcanoes, Magma, Imaging, Scanning electron microscopy, Grain size, Lithology, Statistical analysis, Classifications, Iceland

51-5114

Arctic research of the United States, Vol.11.

U.S. Interagency Arctic Research Policy Committee, Myers, C.E., ed, Haugh, J., ed, Cate, D.W., ed, MP 4062, Washington, D.C., 1997, 82p., For selected papers see 51-5115 through 51-5122.

Research projects, International cooperation, Organizations, Environmental protection, Remote sensing, Geological surveys, Economic development, Hydrocarbons, Ecosystems

This journal presents an assessment of current research projects conducted by the United States in arctic and subarctic regions.

51-5115

MMS Alaska Arctic Environmental Studies—melding science and traditional ecological knowledge for future offshore oil and gas development decisions.

Baffrey, M., et al, *Arctic research of the United States,* Spring/summer 1997, Vol.11, p.4-9, 4 refs.

Ocean environments, Natural resources, Economic development, Exploration, Hydrocarbons, Petroleum industry, Environmental impact, Environmental protection, Ecology, Meetings, United States—Alaska, Beaufort Sea

51-5116

Undiscovered oil and gas potential of the Alaska Federal offshore—1995 national resource assessment.

Sherwood, K.W., Craig, J.D., Cooke, L.W., *Arctic research of the United States,* Spring/summer 1997, Vol.11, p.10-21, 21 refs.

Ocean environments, Marine geology, Natural resources, Natural gas, Crude oil, Economic development, Oil recovery, Cost analysis, United States—Alaska, Beaufort Sea

51-5117

Oil resources and Federal lands on the North Slope of Alaska.

Houseknecht, D., *Arctic research of the United States,* Spring/summer 1997, Vol.11, p.22-24.

Geological surveys, Natural resources, Crude oil, Exploration, Economic development, Environmental impact, Environmental protection, Legislation, United States—Alaska

51-5118

Past and future in an Alaskan desert—research in the Kobuk sand dunes.

Mann, D.H., Heiser, P.A., *Arctic research of the United States,* Spring/summer 1997, Vol.11, p.63-65.

Arctic landscapes, Deserts, Global change, Geomorphology, Floodplains, Ecosystems, Research projects, United States—Alaska—Kobuk River

51-5119

International cooperation in the Beringia region.

Richter, P., *Arctic research of the United States,* Spring/summer 1997, Vol.11, p.66-67.

International cooperation, Research projects, Organizations, Education

51-5120

Monitoring change in the Bering Glacier region, Alaska, using Landsat TM and ERS-1 imagery.

Payne, J.F., Coffeen, M., Macleod, R.D., Kempka, R., Reid, F.A., Molnia, B.F., *Arctic research of the United States,* Spring/summer 1997, Vol.11, p.75-79, 9 refs.

Glacier surveys, Glacier oscillation, Glacier surges, Ice edge, Spaceborne photography, LANDSAT, Vegetation patterns, Landscape development, Classifications, United States—Alaska—Bering Glacier

51-5121
Toward a new circumpolar Arctic vegetation map.
Walker, D.A., Talbot, S.S., *Arctic research of the United States,* Spring/summer 1997, Vol.11, p.80-81.
Arctic landscapes, Vegetation patterns, Tundra vegetation, Sensor mapping, Spaceborne photography, Radiometry, Research projects

51-5122
Digital shaded-relief map of Alaska.
Riehle, J., et al, *Arctic research of the United States,* Spring/summer 1997, Vol.11, p.82 + map.
Geological maps, Topographic maps, Tectonics, Geologic structures, Bedrock, United States—Alaska

51-5123
Effects of lateral viscosity variations on present-day horizontal motions and baseline deformations due to glacial isostatic adjustment.
Giunchi, C., Spada, G., Sabadini, R., *Physics and chemistry of the earth,* July 1997, 21(4), p.325-330, 27 refs.
Glacial geology, Isostasy, Rheology, Deformation, Viscosity, Earth crust, Models

51-5124
Comparison of retracking algorithms for ERS-1 altimeter data over Greenland.
Leeuwenburgh, O., Tscherning, C.C., Knudsen, P., Andersen, O.B., *Physics and chemistry of the earth,* July 1997, 21(4), p.331-336, 11 refs.
Remote sensing, Ice sheets, Spacecraft, Radar echoes, Height finding, Profiles, Scattering, Accuracy, Statistical analysis, Greenland

51-5125
Acquisition and processing of high precision Greenland marine gravity data.
Strykowski, G., Forsberg, R., Larsen, M.D., *Physics and chemistry of the earth,* July 1997, 21(4), p.353-356, 1 ref.
Oceanographic surveys, Geophysical surveys, Gravity, Subpolar regions, Shores, Statistical analysis, Computer programs, Accuracy, Greenland

51-5126
Thermodynamics and kinetics of the solid solution of HCl in ice.
Thibert, E., Domine, F., *Journal of physical chemistry B,* May 1, 1997, 101(18), p.3554-3565, 78 refs.
Ice physics, Cloud physics, Polar stratospheric clouds, Simulation, Ice vapor interface, Doped ice, Thermodynamics, Condensation, Vapor diffusion, Solubility, Snow air interface, Impurities

51-5127
Proceedings. Ground freezing 97.
International Symposium on Ground Freezing, 8th, and Frost Action in Soils (formerly Frost in Geotechnical Engineering), 3rd, Luleå, Sweden, Apr. 15-17, 1997, Knutsson, S., ed, Rotterdam, A.A. Balkema, 1997, 546p., Refs. passim. For individual papers see 51-5128 through 51-5209.
Soil freezing, Frost heave, Frozen ground strength, Frozen ground thermodynamics, Artificial freezing, Soil stabilization, Soil water migration, Freezing front, Ice lenses, Permafrost, Frost protection, Frost resistance

51-5128
Related effects on frost action: freezing and solar radiation indices.
Dysli, M., Lunardini, V.J., Stenberg, L., MP 4063, International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.3-23, 35 refs.
Soil freezing, Freezing front, Frost penetration, Frost action, Frozen ground thermodynamics, Freezing indexes, Soil air interface, Surface temperature, Solar radiation, Insolation, Mathematical models

The freezing index has its origin in the very old Stefan's solution for the equation of thermal diffusion which permits, in particular, the calculation of the depth of the freezing front. The temperature of the soil surface is the value which should be used in the calculation of the depth of the freezing front; however, air temperature is generally used because it is the measured meteorological parameter. In the calculation of the freezing front, the freezing index of the air is corrected by a factor or a summation parameter. Besides the temperature of the air, the temperature of the soil surface depends on numerous meteorological parameters such as wind, solar radiation, surface radiation, change of phase phenomena. With the exception of arctic and subarctic regions and if the average wind speed is not too high, solar radiation is probably the parameter which has the largest effect on the soil surface temperature. The cumulative curve of winter temperatures is used for the determination of the freezing index. This curve may have several peaks and, therefore, the determination of the freezing index of the air may vary from country to country and according to different standards. The report will endeavor to propose a standard procedure for the calculation of the freezing index of the air. This report is the result of a group effort with the aim of providing a practical, rather than a theoretical, treatment of the subject.

51-5129
Preliminary results of frost heave experiments using standard test sample provided by TC8.
Fukuda, M., Kim, H.S., Kim, Y.C., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.25-30, 4 refs.
Soil freezing, Freezing front, Frost heave, Frost penetration, Frozen ground strength, Frost resistance, Soil pressure, Soil tests

51-5130
Estimation of frost heave and thaw weakening by statistical analyses and physical models.
Kujala, K., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.31-41, 47 refs.
Soil freezing, Frost penetration, Frost heave, Frozen ground strength, Frozen ground thermodynamics, Ground thawing, Thaw weakening, Statistical analysis, Computerized simulation

51-5131
Mechanical properties data base for ground freezing applications.
Ladanyi, B., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.43-52, 38 refs.
Soil freezing, Artificial freezing, Frozen ground temperature, Frozen ground thermodynamics, Frozen ground compression, Frozen ground strength, Soil creep, Soil stabilization, Computerized simulation, Mathematical models

51-5132
Field and laboratory methods for determining deformation properties in thawing soils.
Saarelainen, S., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.53-62, 21 refs.
Subgrade soils, Soil freezing, Frost heave, Frozen ground strength, Ground thawing, Thaw weakening, Thaw consolidation, Frozen ground settling, Soil tests, Road maintenance

51-5133
Winter earthworks in seasonal freezing regions ought to become an accepted construction method—frost heaving accelerates the consolidation of filling materials.
Akagawa, S., Sakai, Y., Ohnuki, H., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.65-72, 2 refs.
Earthwork, Earth fills, Embankments, Soil freezing, Soil water migration, Frost heave, Freeze thaw tests, Frost resistance, Frozen ground strength, Frozen ground compression

51-5134
Thermal interaction of petroleum wells with frozen rocks: the new solution of the problem.
Bondarev, E.A., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.73-76, 2 refs.
Oil wells, Frozen rock temperature, Frozen ground thermodynamics, Heat transfer, Mathematical models

51-5135
Long-term results of testing of foam cover for remediation of degraded permafrost.
Feklistov, V.N., Mel'nikov, V.P., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.77-80, 10 refs.
Permafrost preservation, Permafrost heat transfer, Ground thawing, Thermal insulation, Soil stabilization, Soil conservation, Land reclamation

51-5136
Formation of massive ice in permafrost.
Fowler, A.C., Noon, C.G., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.81-85, 17 refs.
Soil freezing, Freezing front, Frost heave, Frozen ground thermodynamics, Subpermafrost ground water, Permafrost heat transfer, Soil water migration, Ground ice, Ice lenses, Mathematical models

51-5137
Ice formation in freezing grounds.
Golubev, V.N., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.87-91, 8 refs.
Soil freezing, Soil water migration, Ground ice, Ice formation, Ice nuclei, Heterogeneous nucleation

51-5138
Applied aspects of the rigid-ice model.
Gorelik, IA.B., Kolunin, V.S., Reshetnikov, A.K., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.93-99, 13 refs.
Soil freezing, Frost heave, Frost penetration, Freezing front, Ice lenses, Soil water migration, Frozen ground thermodynamics, Frozen ground compression, Mathematical models

51-5139
General thermomechanical model of freezing soil with numerical application.
Hartikainen, J., Mikkola, M., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.101-105, 7 refs.
Soil freezing, Freezing front, Frost penetration, Frost heave, Soil water migration, Frozen ground thermodynamics, Computerized simulation, Mathematical models

51-5140
Heat transfer in artificial ground freezing.
Holden, J.T., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.107-112, 4 refs.
Soil freezing, Artificial freezing, Frozen ground thermodynamics, Freezing front, Stefan problem, Mathematical models

51-5141

Hypothesis on the mechanism of "salt-frost scaling" of porous, brittle building materials.

Lindmark, S., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.113-120, 12 refs.

Concrete freezing, Concrete durability, Corrosion, Freeze thaw tests, Frost action, Frost weathering, Ice lenses, Ice salinity

51-5142

Prediction of temperature regime of roadbed on permafrost considering unsteady water filtration.

Liu, J.K., Wu, Z.W., Ma, W., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.121-125, 8 refs.

Roadbeds, Embankments, Subgrade soils, Permafrost beneath roads, Permafrost heat transfer, Soil freezing, Soil water migration, Frost action, Frozen ground thermodynamics, Mathematical models

51-5143

Thawing of frozen soil with a linearly increasing surface temperature.

Lunardini, V.J., MP 4067, International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.127-130, 4 refs.

Ground thawing, Thaw depth, Frozen ground thermodynamics, Frozen ground temperature, Soil temperature, Surface temperature, Stefan problem, Mathematical models

The Neumann solution, valid for a surface temperature that instantaneously increases, has been used for many years to estimate freeze/thaw depths. If the surface temperature varies with time, the Neumann solution can be used with an equivalent surface temperature. This can give reliable results for the total depth of freeze/thaw, but is significantly in error at intermediate times. An analytic solution to the problem with the surface temperature increasing linearly with time is presented here and compared to the results predicted by the Neumann solution. If the Stefan number is small, the growth of the thawed zone is nearly linear in time, but as the Stefan increases, it becomes increasingly nonlinear. The Neumann solution greatly exaggerates the thermal changes during the early growth and underpredicts them during the latter part of the warming. These results can lead to significant errors in calculating the effects of warming on frozen ground.

51-5144

Macroscopic frost heave theory—coupling equations and criteria for creation of new ice lens.

Miyata, Y., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.131-138, 12 refs.

Soil freezing, Frost heave, Freezing front, Soil water migration, Soil pressure, Ice lenses, Frozen ground thermodynamics, Mathematical models

51-5145

Mathematical model called M_1 and the Gilpin model of soil freezing.

Nakano, Y., MP 4064, International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.139-146, 22 refs.

Soil freezing, Freezing front, Ice lenses, Frozen ground thermodynamics, Soil water migration, Soil pressure, Mathematical models

The property of a frozen fringe described by the Gilpin model is studied analytically when an ice layer is growing. The frozen fringe described by the Gilpin model is shown to be essentially one special case of the model M_1 introduced by Nakano in 1990. By comparing the behavior of the Gilpin's frozen fringe with experimental data of two kinds of porous media, the author shows that the Gilpin model is too restrictive to accurately describe their behavior.

51-5146

Freeze-thaw effect on soil-bentonite mixtures.

Ravaska, O., Kujala, K., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.147-152, 3 refs.

Clay soils, Earth fills, Soil freezing, Freeze thaw tests, Frost resistance, Sealing, Waste disposal, Soil pollution, Soil stabilization, Land reclamation

51-5147

Freeze-thaw indices in northernmost Fennoscandia according to meteorological observations, 1980-1991.

Seppälä, M., Hassinen, S., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.153-160, 33 refs.

Weather stations, Meteorological data, Air temperature, Degree days, Freezing indexes, Frost forecasting, Permafrost indicators, Permafrost distribution, Permafrost forecasting, Finland, Norway, Sweden

51-5148

Dependence of unfrozen water quantity on total moisture content.

Starostin, E.G., Timofeev, A.M., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.161-164, 19 refs.

Soil freezing, Ground ice, Frozen ground temperature, Soil water, Hygroscopic water, Unfrozen water content

51-5149

Characteristics of the soil-structures of frozen soils.

Sugita, A., Ishizaki, T., Fukuda, M., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.165-169, 4 refs.

Soil freezing, Soil classification, Soil structure, Microstructure, Scanning electron microscopy

51-5150

Microstructure of freezing front in freezing soils.

Takeda, K., Okamura, A., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.171-178, 6 refs.

Soil freezing, Freezing front, Interstitial ice, Ice lenses, Soil water migration, Soil structure, Microstructure, Microanalysis, Photographic techniques

51-5151

Some recent mathematical results on the problem of soil freezing.

Talamucci, F., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.179-186, 11 refs.

Soil freezing, Frost heave, Freezing front, Frost penetration, Interstitial ice, Ice lenses, Frozen ground thermodynamics, Mathematical models

51-5152

Experimental study on microstructure near freezing front during soil freezing.

Watanabe, K., Mizoguchi, M., Ishizaki, T., Fukuda, M., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.187-192, 9 refs.

Soil freezing, Frost heave, Freezing front, Ice lenses, Frozen ground thermodynamics, Soil structure, Microstructure

51-5153

Permeability changes in a fine-grained till due to cycles of freezing and thawing.

Viklander, P., Knutsson, S., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.193-202, 25 refs.

Glacial till, Soil freezing, Soil structure, Frost action, Freeze thaw tests, Particle size distribution, Soil water migration, Permeability

51-5154

Essential characteristics of frozen fringe and determination of its parameters.

Xu, X.Z., Wu, Z.W., Ishizaki, T., Fukuda, M., Chuvilin, E.M., Ershov, E.D., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.203-207, 4 refs.

Soil freezing, Frost heave, Freezing front, Ice lenses, Frozen ground thermodynamics, Soil water migration

51-5155

Dynamic investigation of mass transfer in freezing soil with computer tomograph.

Zhang, L.X., Pu, Y.B., Liao, Q.R., Gu, T.X., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.209-212, 4 refs.

Soil freezing, Frost heave, Freezing front, Ice lenses, Soil water migration, Frozen ground thermodynamics, X ray analysis, Computer applications

51-5156

Study of convection in liquid seasonal cooling devices in the warm period of a year.

Zhang, R.V., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.213-216, 3 refs.

Earth dams, Earth fills, Soil freezing, Artificial freezing, Soil stabilization, Permafrost beneath structures, Permafrost heat transfer, Permafrost preservation, Heat pipes, Cooling systems, Convection, Russia—Yakutsk

51-5157

Effects of cooling rate on frost action in closed system.

Zhu, Q., Ogawa, S., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.217-224, 9 refs.

Soil freezing, Frost heave, Frost action, Soil water migration, Cooling rate, Soil pressure, Frozen ground thermodynamics

51-5158

Capillary rise of water in geotextiles.

Henry, K.S., Holtz, R.D., MP 4065, International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.227-233, 13 refs.

Soil freezing, Frost heave, Frost protection, Geotextiles, Soil stabilization, Soil water migration, Capillarity, Vapor barriers, Waterproofing

Capillary barriers can reduce frost heave in soils when they are placed above the water table and below the depth of freezing. Past guidance for the use of granular capillary barriers suggests that they should be thicker than the height of capillary rise of water in them. However, a review of capillary physics indicates that a porous material can be a capillary barrier when its base is placed above the water table at a distance greater than the capillary rise of water in it. The authors tested this idea experimentally and present results that support it. Geotextile capillary barriers may lose effectiveness when soil particles become emplaced in them. This could be mitigated by using either geotextiles with increased thickness or smaller pore sizes, or both, or geocomposite capillary barriers.

51-5159

Suction characteristics and frost heave of cohesive soils.

Jones, R.H., Baba, H.U., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.235-240, 16 refs.

Clay soils, Soil freezing, Soil water migration, Frost heave, Frost resistance, Frozen ground strength, Soil tests

51-5160

Test construction of frost blanket using lime-stabilized soil.

Kawabata, S., Kamiya, M., Ohsawa, M., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.241-246, 3 refs.

Subgrade soils, Soil freezing, Frost heave, Frost protection, Liming, Soil stabilization, Subgrade maintenance, Road maintenance

51-5161

Frost control—design, construction and monitoring of TPPT test roads.

Kivikoski, H., Mäkelä, H., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.247-254, 1 ref.

Subgrade soils, Soil freezing, Frost heave, Frost resistance, Frost protection, Soil stabilization, Subgrade maintenance, Road maintenance, Research projects, Finland

51-5162

Displacement of shallow foundation by the effect of frost heaving forces.

Musorin, A.V., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.255-257, 5 refs.

Subgrade soils, Foundations, Soil freezing, Frost heave, Frost penetration, Frost resistance, Frozen ground strength, Frozen ground compression, Frost protection, Soil stabilization

51-5163

Frost heave analysis by finite element method.

Okamoto, T., Miyata, Y., Minami, Y., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.259-266, 12 refs.

Soil freezing, Freezing front, Frost heave, Soil water migration, Soil pressure, Frozen ground thermodynamics, Frozen ground strength, Mathematical models

51-5164

Use of geotextiles in formation of capillary break structures.

Saarelainen, S., Werner, G., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.267-272, 4 refs.

Subgrade soils, Soil freezing, Frost penetration, Frost heave, Frost protection, Capillarity, Geotextiles, Thermal insulation, Waterproofing, Vapor barriers

51-5165

Sod peat as frost protection in road structure.

Salmenkaita, S., Kujala, K., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.273-279, 3 refs.

Subgrade soils, Soil freezing, Frost heave, Frost resistance, Frost protection, Peat, Thermal insulation, Road maintenance, Finland

51-5166

Frozen heaving of large dispersed soiled system of Zabaikalje.

Sherstenev, D.M., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.281-288, 16 refs.

Sands, Loams, Soil texture, Soil freezing, Frost heave, Frost resistance, Frozen ground strength

51-5167

Validation of the VTI frost heave model.

Stenberg, L., Hermansson, Å., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.289-292, 3 refs.

Subgrade soils, Soil freezing, Frost penetration, Frost heave, Frost resistance, Road maintenance, Computerized simulation, Sweden

51-5168

Effect of geotextiles as capillary breaks on frost heave reduction.

Tsuchiya, F., Tsuji, O., Yokota, S., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.293-296, 5 refs.

Subgrade soils, Soil freezing, Frost heave, Frost resistance, Frost protection, Soil stabilization, Capillarity, Geotextiles, Vapor barriers, Waterproofing, Road maintenance

51-5169

Comparison between measured and calculated frost heave, frost penetration and formation of ice lenses.

Vikström, L., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.297-305, 4 refs.

Subgrade soils, Soil freezing, Frost penetration, Frost heave, Ice lenses, Frost forecasting, Road maintenance, Computerized simulation

51-5170

Swedish National Road Administration's frost damage prevention program.

Wirstam, H.A., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.307-309.

Highway planning, Frost heave, Frost protection, Frost forecasting, Road maintenance, Computerized simulation, Research projects, Sweden

51-5171

Constitutive relation of saturated frozen silt in torsion.

He, P., Zhu, Y.L., Xian, C.D., Zhang, Z., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.313-316, 2 refs.

Frozen ground strength, Frozen ground compression, Soil tests, Strain tests, Stress strain diagrams, Mathematical models

51-5172

Cryogenical alterations of fabric and shear strength of clayey soils.

Hohmann-Porebska, M., Czurda, K.A., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.317-326, 26 refs.

Clay soils, Soil freezing, Frost action, Soil structure, Microstructure, Frozen ground strength, Shear strength

51-5173

Failure criterion of unsaturated soils subjected to freezing and thawing.

Nishimura, T., Momoi, T., Tsukada, K., Ogawa, S., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.327-333, 14 refs.

Soil freezing, Frost action, Frozen ground strength, Frozen ground compression, Ground thawing, Thaw weakening, Soil tests, Freeze thaw tests

51-5174

Computer controlled triaxial freeze-thaw-shear apparatus.

Ono, T., Mitachi, T., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.335-339, 5 refs.

Clay soils, Soil freezing, Frozen ground strength, Frozen ground compression, Frozen ground settling, Soil tests, Freeze thaw tests, Shear strength, Computer applications

51-5175

Deformation properties of frozen soil under sine-varying temperature.

Sheng, Y., Wu, Z.W., Chang, X.X., Ma, W., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.341-343, 4 refs.

Subgrade soils, Foundations, Permafrost beneath structures, Frozen ground strength, Frozen ground compression, Frozen ground settling, Soil creep, Soil tests

51-5176

Determination of failure time in the creep of frozen soil subjected to varying stress.

Sheng, Y., Wu, Z.W., Ma, W., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.345-347, 4 refs.

Sands, Permafrost beneath structures, Frozen ground strength, Frozen ground compression, Soil creep, Soil tests

51-5177

Adfreezing frost heave force on concrete structures in natural ground.

Suzuki, T., Sawada, S., Yamashita, S., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.349-353, 2 refs.

Concrete structures, Concrete piles, Concrete strength, Frost resistance, Frost protection, Soil freezing, Frost heave, Ice adhesion

51-5178

Effect of pendulum speed on impact toughness of frozen soil.

Yu, Q.H., Zhu, Y.L., Zhang, J.M., He, P., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.355-359, 5 refs.

Frozen ground strength, Cracking (fracturing), Soil tests, Impact tests

51-5179

Experimental study on torsion test of frozen loess.

Zhang, J.M., Peng, W.W., Zhang, C.Q., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.361-364, 2 refs.

Loess, Frozen ground strength, Shear strength, Soil tests, Strain tests

51-5180

Necessary medium for the study of extremely deep shaft-freezing technique: a development of TYJ-200 triaxial high-pressure testing machine specially for frozen soils.

Zhang, Y.L., Xu, B.Z., Li, K., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.365-368, 2 refs.

Coal, Mining, Shaft sinking, Artificial freezing, Soil freezing, Soil stabilization, Frozen ground strength, Frozen ground compression, Soil creep, Soil tests, Test equipment, Strain measuring instruments

51-5181

Study of the ionic permeability of frozen soils and ice.

Chuvilin, E.M., Smirnova, O.G., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.371-374, 6 refs.

Soil pollution, Frozen ground chemistry, Ground ice, Ice composition, Impurities, Ion diffusion, Permeability

51-5182

Frozen soil barriers for hazardous waste confinement.

Dash, J.G., Fu, H.Y., Leger, R., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.375-380, 10 refs.

Radioactive wastes, Waste disposal, Soil pollution, Frozen ground chemistry, Soil freezing, Artificial freezing, Soil stabilization, Land reclamation

51-5183

Interaction of oil with frozen soils.

Ershov, E.D., Chuvilin, E.M., Smirnova, O.G., Naletova, N.S., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.381-384, 7 refs.

Oil spills, Soil pollution, Frozen ground chemistry, Soil chemistry

51-5184

Particularities of frozen saline soils electric and elastic properties.

Frolov, A.D., Chervinskaia, O.P., Zykov, IU.D., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.385-390, 5 refs.

Saline soils, Sands, Clay soils, Marine deposits, Frozen ground chemistry, Frozen ground strength, Soil creep

51-5185

Water migration during gas hydrate formation in porous media.

Mel'nikov, V.P., Nesterov, A.N., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.391-395, 11 refs.

Hydrates, Clathrates, Sands, Clay soils, Frozen ground chemistry, Soil water migration

51-5186

Redistribution of ions close to the growing ice inclusions.

Ostroumov, V.E., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.397-400, 7 refs.

Loams, Soil structure, Permafrost structure, Permafrost indicators, Soil freezing, Ice lenses, Frozen ground chemistry, Ion diffusion

51-5187

Case of adopting soil freezing for environmental protection.

Shiina, M., Kashiwagi, T., Kitamura, Y., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.401-405.

Soil freezing, Artificial freezing, Soil stabilization, Shaft sinking, Pipe laying, Ground water, Waterproofing

51-5188

Salt expansion and frost heave of freezing saline soils.

Xu, X.Z., Wang, J.C., Zhang, L.X., Deng, Y.S., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.407-414, 9 refs.

Loess, Clay soils, Sands, Saline soils, Soil freezing, Frost heave, Frozen ground chemistry, Frozen ground strength, Frozen ground compression, Soil creep

51-5189

On the heat exchange of freeze pipe with liquid nitrogen in ground freezing.

Chen, R.J., Zhu, L.N., Wu, C.Z., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.417-420, 3 refs.

Soil freezing, Artificial freezing, Shaft sinking, Soil stabilization, Pipes (tubes), Liquefied gases, Heat transfer, Mathematical models

51-5190

Deformation of a retaining wall by ground freezing.

Danyluk, L.S., Ketcham, S.A., MP 4066, International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.421-426.

Earth dams, Earth fills, Concrete structures, Walls, Soil freezing, Frost resistance, Frost heave, Frost action, Soil pressure, Dislocations (materials)

Field measurements were made of the horizontal movement of a large retaining wall in Hopkinton, NH, USA. The reinforced concrete retaining wall is part of an earthen dike on the downstream side of an earth-filled dam. The dike is used to separate an existing wood-cribbed dam and its associated forebay pool from the outlet channel of the earth dam. Previous surveys have indicated that outward displacements at the top of the wall occur during the winter and rebound partially during the spring. Observations of the wall show severe, permanent deformation. Prior to the 1995-96 winter season, the US Army Cold Regions Research and Engineering Laboratory installed various sensors on and behind the wall to continuously measure these displacements and to provide information for the repair strategy. The measurements indicate that the movement is frost related. Horizontal movement at the top of the wall of 20 mm, and increased earth pressure behind the wall of almost 200 kPa, were measured during the period of frost penetration. As the frost subsided in the spring, the earth pressure approached pre-winter values. Although the displacement at the top of the wall did rebound, it did not recover completely.

51-5191

Experiments applying tire chips as frost insulation in concrete channels.

Kubo, H., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.427-432, 7 refs.

Tires, Waste disposal, Drains, Culverts, Channels (waterways), Concrete slabs, Frost action, Frost protection, Thermal insulation, Japan—Hokkaido

51-5192

Deformable freeze pipe.

Lou, G.D., Wang, Z.T., Li, C.Z., Wang, J.P., Zhou, X.M., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.433-437, 2 refs.

Mining, Shaft sinking, Soil freezing, Artificial freezing, Soil stabilization, Pipes (tubes)

51-5193

Calculation on the thickness of artificially frozen wall for supporting deep base pit.

Ma, W., Wu, Z.W., Xu, X.Z., He, C.X., Sheng, Y., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.439-443, 4 refs.

Foundations, Pits (excavations), Walls, Soil freezing, Artificial freezing, Frozen ground strength, Soil stabilization, Mathematical models

51-5194

Sill pillar mining beneath frozen fill.

Marklund, P.I., Andersson, P.O., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.445-453, 6 refs.

Mining, Shaft sinking, Earth fills, Soil freezing, Artificial freezing, Soil stabilization

51-5195

Viscoelastic calculation on displacement and stress distribution in artificially frozen wall.

Niu, Y.H., Zhang, C.Q., Zhang, J.M., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.455-459, 3 refs.

Shaft sinking, Walls, Soil freezing, Artificial freezing, Soil stabilization, Frozen ground strength, Soil creep, Mathematical models

51-5196

Icicle and frost heave prevention by adiabatic treatment in existing tunnel.

Okada, K., Fujii, T., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.461-467, 6 refs.

Railroad tunnels, Linings, Icicles, Ice prevention, Frost heave, Frost protection, Thermal insulation, Waterproofing, Heat pipes, Heat transfer

51-5197

Technology of rock protection from freezing out in mining gold placer deposits of Siberia.

Rashkin, A.V., Kostromin, M.V., Karasev, K.I., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.469-472, 1 ref.

Gold, Placer mining, Dredging, Frozen rocks, Rock excavation, Artificial thawing, Ice prevention, Frost protection, Thermal insulation, Russia—Siberia

51-5198

Some problems in foundation engineering on permafrost in connection with global climatic changes.

Sadovskiĭ, A.V., Kutvitskaia, N.B., Bondarenko, G.I., Grebenets, V.I., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.473-477, 14 refs.

Foundations, Permafrost beneath structures, Permafrost preservation, Soil conservation, Soil stabilization, Global warming, Ground thawing

51-5199

Discrete element modelling of pipe uplift in frozen soil regimes.

Selvadurai, A.P.S., Sepehr, K., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.479-486, 17 refs.

Underground pipelines, Pipeline freezing, Soil freezing, Frost heave, Frost resistance, Frost protection, Frozen ground strength, Frozen ground compression, Mathematical models

51-5200

Effect of intensified freezing process on deformation control of ice wall.

Wang, J.P., Yu, X., Lou, G.D., Zhou, X.M., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.487-490, 4 refs.

Shaft sinking, Soil freezing, Artificial freezing, Soil creep, Soil pressure, Soil stabilization, Frozen ground strength, Frost protection

51-5201

Large-scale model test on the artificial freezing of foundation with liquid nitrogen.

Zhu, L.N., Chen, R.J., Wu, C.Z., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.491-495, 4 refs.

Foundations, Pits (excavations), Walls, Soil freezing, Artificial freezing, Soil stabilization, Frozen ground strength, Liquefied gases

51-5202

Artificial ice plug for a hydro tunnel.

Berggren, A.L., Sandvold, A., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.499-502, 2 refs.

Hydraulic structures, Water intakes, Culverts, Tunnels, Artificial freezing, Water flow, Flow control, Norway

51-5203

Applications of artificial ground-freezing with liquid nitrogen (LIN)/new control hardware.

Buinger, A., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.503-507.

Utilities, Sewage disposal, Water pipelines, Drains, Culverts, Flow control, Soil freezing, Artificial freezing, Soil stabilization, Liquefied gases, Germany

51-5204

Application of AGFI to Shanghai Metro 1# line construction.

Chen, X.S., Liu, J.H., Zhu, H.S., Bai, T.H., Ge, S.P., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.509-512, 3 refs.

Railroad tunnels, Drains, Culverts, Soil freezing, Artificial freezing, Soil stabilization, Municipal engineering, China—Shanghai

51-5205

Application of freezing method for widening an existing tunnel.

Katayama, H., Joushima, M., Tanaka, M., Tanaka, K., Tsuji, T., Usui, T., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.513-518, 2 refs.

Utilities, Electric power, Tunneling (excavation), Soil freezing, Artificial freezing, Soil stabilization, Frozen ground strength, Municipal engineering, Japan

51-5206

Application of staggered freezing method to shaft sinking in Jining No.3 coal mine.

Peng, L.H., Su, L.F., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.519-523, 2 refs.

Coal, Mining, Shaft sinking, Soil freezing, Artificial freezing, Soil stabilization, Frozen ground strength, China—Shandong Province

51-5207

Problem of lining failure in freeze shafts after construction.

Su, L.F., Zhou, X.M., Lou, G.D., Li, C.Z., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.525-530, 5 refs.

Coal, Mining, Shaft sinking, Soil freezing, Artificial freezing, Soil stabilization, Frozen ground strength, Frozen ground settling, Mine shafts, Linings, Accidents, China

51-5208

Application of ground freezing technique in Lianghuai coal mine area of China.

Zhang, W., Pang, R.Q., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.531-535.

Coal, Mine shafts, Shaft sinking, Soil freezing, Artificial freezing, Soil stabilization, China—Anhui Province

51-5209

Application of freezing method to brace a foundation pit.

Zhou, X.M., et al, International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.537-540, 2 refs.

Pits (excavations), Foundations, Hydraulic structures, Soil freezing, Artificial freezing, Soil stabilization, Utilities, Water supply, Municipal engineering, China—Shanghai

51-5210

Crustal structure beneath Ice Stream C and Ridge BC, West Antarctica from seismic refraction and gravity measurements.

Munson, C.G., Bentley, C.R., Recent progress in antarctic earth science. Edited by Y. Yoshida, Tokyo, Japan, Terra Scientific Publishing Company, 1992, p.507-514, 19 refs.

Seismic surveys, Subglacial observations, Earth crust, Gravimetric prospecting, Antarctica—West Antarctica, Antarctica—Marie Byrd Land, Antarctica—Ross Ice Shelf

A 1988 seismic refraction/wide-angle reflection and gravity profile was oriented transverse to the axis of the ice stream C and extended 63 km across the stream to ridge BC in West Antarctica. The refraction and wide-angle reflection data were modeled using a two-dimensional ray trace forward modeling program to match travel times of refracted and reflected arrivals. Forward modeling of the gravity data was used to further define the structural model where seismic ray coverage was inadequate. These data constrain the velocity structure of the upper and middle crust and provide evidence for a low-velocity zone beneath the ice that varies in thickness from 100 m to 2.5 km within an apparent graben beneath ridge BC. Other major features of the structural model are: weak to moderate lateral variations in crustal structure, a basement crustal velocity that varies from 5.65 to 5.90 km/s, a sub-basement crustal velocity of 6.85 km/s at a relatively shallow depth (5-7 km), and a reflective zone (12- to 14-km depth) that may indicate mafic underplating. (Auth.)

51-5211

Four climate cycles in Vostok ice core.

Petit, J.R., et al, *Nature,* May 22, 1997, 387(6631), p.359-360, 7 refs.

Ice cores, Climatic changes, Paleoclimatology, Antarctica—Vostok Station

The Russian-American and French international effort for drilling in ice achieved both a technical and a scientific success by reaching a depth of 3,350 m at the Russian Vostok Station. In addition to being the deepest core, the Vostok core is now believed to cover the past four glacial-interglacial cycles (*ca.* 400,000 years), a surprisingly long climate sequence which will be a valuable tool for paleoclimatologists.

51-5212

Algorithm for reconstruction of atmospheric CO_2 from deepsea sediments.

Berger, W.H., *Naturwissenschaften,* Nov. 1996, 83(11), p.519-522, 27 refs.

Carbon dioxide, Sediments, Sea ice, Ice cores

It is suggested that CO_2 reconstruction can be largely divorced from physical theory, and that a global signal—the oxygen isotope record representing ice mass variation and hence sea level fluctuation—is adequate for reconstruction of past levels of atmospheric CO_2, using regression statistics. This is shown through the combining of previously published CO_2 records and $^{18}O/^{16}O$ records. The ratio changes in response to sea ice fluctuations, thus being tied to sea level variations as well. CO_2 variations closely follow sea level variations and appear to be superior to the changes indicated by oxygen isotope data.

51-5213

Frozen ground. *International Permafrost Association. News bulletin,* Nov. 1989, No.6, 20p.

Organizations, Meetings, Permafrost, Research projects, International cooperation

51-5214

Frozen ground. *International Permafrost Association. News bulletin,* July 1990, No.7, 21p.

Organizations, Meetings, Permafrost, Research projects, International cooperation

51-5215

Frozen ground. *International Permafrost Association. News bulletin,* Dec. 1990, No.8, 28p.

Organizations, Meetings, Permafrost, Research projects, International cooperation

51-5216

Frozen ground. *International Permafrost Association. News bulletin,* June 1991, No.9, 20p.

Organizations, Meetings, Permafrost, Research projects, International cooperation

51-5217

Frozen ground. *International Permafrost Association. News bulletin,* Dec. 1991, No.10, 24p.

Organizations, Meetings, Permafrost, Research projects, International cooperation

51-5218

Zackenberg Ecological Research Operations—1st annual report, 1995.

Danish Polar Center. Ministry of Research & Technology, Meltofte, H., ed, Thing, H., ed, Copenhagen, 1996, 64p.

Ecosystems, Subpolar regions, Research projects, Ecosystems, Climatology, Biomass, Sampling, Environmental protection, Monitors, Greenland—Zackenberg

51-5219

Global distribution of glacier properties: a stochastic scaling paradigm.

Bahr, D.B., *Water resources research,* July 1997, 33(7), p.1669-1679, 21 refs.

Glaciology, Theories, Glacier surfaces, Distribution, Glacier mass balance, Glacier thickness, Ice volume, Models, Correlation, Forecasting, Alpine glaciation, Statistical analysis

51-5220

Hydrograph separations in an arctic watershed using mixing model and graphical techniques.

McNamara, J.P., Kane, D.L., Hinzman, L.D., *Water resources research,* July 1997, 33(7), p.1707-1719, 36 refs.

Watersheds, Stream flow, Hydrography, Permafrost hydrology, Active layer, Thaw depth, Storms, Origin, Snowmelt, Water storage, Statistical analysis, Seasonal variations

51-5221

Seed floating ability and distribution of alpine plants along a northern Swedish river.

Danvind, M., Nilsson, C., *Journal of vegetation science,* May 1997, 8(2), p.271-276, 23 refs.

Plant ecology, Distribution, Vegetation patterns, Dispersions, Buoyancy, Alpine landscapes, Littoral zone, River flow, Sediment transport, Simulation, Statistical analysis, Sweden

51-5222

Pleistocene glacier formation in the Peruvian and Bolivian Andes. [Die pleistozäne Vergletscherung der Ande Perus und Boliviens abgeleitet aus Formen einer flächendeckend-integrativen Höhenlinienanalyse]

Schulz, G., *Berliner geographische Abhandlungen,* 1994, Vol.58, 156p. + maps, In German with English summary. Refs. p.154-156.

Pleistocene, Glacial geology, Cirques, Glaciation, Topographic maps, Alpine glaciation, Landforms, Geomorphology, Snow line, Classifications, Peru—Andes, Bolivia—Andes

51-5223

New global sea-ice and sea surface temperature data set.

Rayner, N.A., Parker, D.E., Annual Climate Diagnostic Workshop, 20th, Seattle, WA, Oct. 23-27, 1996. Proceedings, Washington, DC, U.S. Department of Commerce, 1996, p.69-72, 1 ref.

DLC QC980.C54a

Climatology, Global change, Marine atmospheres, Sea ice distribution, Surface temperature, Temperature variations, Statistical analysis

51-5224

Decadal variability of snow in the western United States.

Cayan, D., Riddle, L., Annual Climate Diagnostic Workshop, 20th, Seattle, WA, Oct. 23-27, 1996. Proceedings, Washington, DC, U.S. Department of Commerce, 1996, p.283, 3 refs.

DLC QC980.C54a

Climatology, Snow accumulation, Snow courses, Periodic variations, Statistical analysis

51-5225

Effect of vortices on selective withdrawal from a two-layer stratified fluid and frazil entrainment into submerged water intake—experimental studies.

Alsafar, T., London, University of Western Ontario, 1996, 111p., M.S. thesis, Refs. p.96-110.

Reservoirs, Hydraulic structures, Water intakes, Water flow, Turbulent flow, Frazil ice, Ice loads, Ice control, Mathematical models

51-5226

Frost-heave induced interaction between buried pipelines and soils.

Hu, J., Montreal, McGill University, 1996, 176p., Ph.D. thesis. With French summary. Refs. p.162-176.

Underground pipelines, Pipeline freezing, Frost resistance, Soil freezing, Frost heave, Frozen ground strength, Frozen ground compression, Soil creep, Mathematical models

51-5227

Creep and strength of frozen soil under triaxial compression.

Fish, A.M., SR 94-32, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Dec. 1994, 13p., ADA-302 885, 49 refs.

Frozen ground strength, Frozen ground compression, Soil creep, Ice strength, Ice deformation, Soil tests, Strain tests, Stress strain diagrams, Ultimate strength, Rheology, Mathematical models

A combined creep and strength model has been developed for the entire (primary, secondary and tertiary) creep and the long-term strength of frozen soil under multiaxial stress at both constant stresses and constant strain rates by a single (unified) constitutive equation. Secondary creep is assumed to be an inflection point of a creep curve defining time to failure. Secondary creep rate is described by a new flow law, the stress function of which includes the first invariant of the stress tensor. The model consists of four principal elements: a constitutive equation, a viscous flow equation and a yield criterion, all united by a time-to-failure function. The yield criterion is selected either in the form of a parabolic (extended) von Mises-Drucker-Prager model or a parabolic (extended) Mohr-Coulomb rupture model. The criteria take into account that, at a certain magnitude of the mean normal stress (σ_{max}), the shear strength of frozen soil reaches a maximum. The yield criteria are included in the time-to-failure function, the shape parameters of which are independent of the loading regime. The model has been verified using test data on creep and the long-term strength of frozen soil under triaxial compression at -10°C.

51-5228

Keeping an ear out ... for avalanches. [A l'écoute ... des avalanches]

Chritin, V., Rossi, M., *Neige et avalanches,* June 1997, No.78, p.2-7,32, In French with English summary. 10 refs.

Avalanches, Avalanche forecasting, Snow acoustics, Acoustic measurement, Warning systems

51-5229

Avalanche beacons: balance sheet and future. [L'ARVA: bilan et perspectives]

Brugger, H., Falk, M., Buser, O., Tschirky, F., *Neige et avalanches,* June 1997, No.78, p.8-11,32, In French with English summary. 14 refs.

Avalanches, Accidents, Rescue equipment, Radio beacons

51-5230

Local avalanche forecasting in France: why and how. [Prévision locale des avalanches en France: pourqui et comment]

Bolognesi, R., *Neige et avalanches,* June 1997, No.78, p.12-17,32, In French with English summary. 10 refs.

Avalanche forecasting, Safety, Warning systems, Computerized simulation, Data transmission, France

51-5231

Cardboard sled for avalanches. [Une luge en carton pour les avalanches]

Reverbel, C., *Neige et avalanches,* June 1997, No.78, p.20, In French with English summary.

Avalanche triggering, Blasting, Sleds

51-5232

Catalog of maps and books. Part 1: Arctic and Atlantic Oceans. [Katalog kart i knig. Chast' I: Severnyĭ ledovityĭ i Atlanticheskiĭ okeany], St. Petersburg, Glavnoe upravlenie navigatsii i okeanografii, 1992, 231p., In Russian.

Maps, Bibliographies, Arctic Ocean, Atlantic Ocean

51-5233

Flora of the Russian Arctic: a critical review of the vascular plants occurring in the arctic region of the former Soviet Union; volume I: *Polypodiaceae—Gramineae.*

Tolmachev, A.I., ed, Packer, J.G., ed, Edmonton, University of Alberta Press, 1995, 330p., Refs. p.xxvii-xxxviii. For vol.2 see 51-5234. For two of the Russian originals see 23-2300 and 26-3874.

DLC QK676.F66 1995

Plants (botany), Arctic landscapes, Mosses, Grasses, Site surveys, Plant physiology, Tundra vegetation, Russia

51-5234

Flora of the Russian Arctic: a critical review of the vascular plants occurring in the arctic region of the former Soviet Union; volume II *Cyperaceae—Orchidaceae.*

Tolmachev, A.I., ed, Packer, J.G., ed, Edmonton, University of Alberta Press, 1995, 233p., Refs. p.xvii-xxviii. For vol.1 see 51-5233. For two of the Russian originals see 23-2300 and 26-3874.

DLC QK676.F66 1995

Plants (botany), Arctic landscapes, Site surveys, Plant physiology, Tundra vegetation, Russia

51-5235

Fate in the marine environment of a minor diesel fuel spill from an antarctic research station.

Cripps, G.C., Shears, J., *Environmental monitoring and assessment,* July 1997, 46(3), p.222-232, 13 refs.

Oil spills, Hydrocarbons, Water pollution, Marine biology, Environmental impact, Antarctica—Faraday Station, Antarctica—Marina Point

Monitoring was undertaken of the marine environment after an accidental oil spill near Faraday Station in Mar. 1992. On the day after the incident concentrations in seawater reached a maximum of 540 µg/l. However, concentrations returned to local background levels within one week. The fuel had an immediate toxic effect on intertidal limpets in the local station area, and 100 animals were found dead the day after the spill. Surviving animals had elevated concentrations of both n-alkanes and polycyclic aromatic hydrocarbons (PAH) for over a month after the spill. This was the result of accumulation from a residue of the diesel being flushed by rainwater into the littoral zone. Seven months after the spill concentrations of both n-alkanes and PAH in limpets living close to the station were still an order of magnitude greater than those found in animals at an uncontaminated control site. The diesel spill itself had a very minor, localized and short-term impact on the antarctic marine environment. (Auth. mod.)

51-5236

Examination of the Bavarian avalanche warning system, winter 1995/96. [Tätigkeits- und Urfahrungsbericht über den Lawinenwarndienst in Bayern—winter 1995/96], *Bayerisches Landesamt für Wasserwirtschaft,* Mar. 1997, 111p., In German.

Avalanches, Alpine landscapes, Safety, Warning systems, Monitors, Avalanche forecasting, Avalanche tracks, Germany—Bavaria

51-5237

Swiss Alps crustal reflectivity analysis. [Propriétés de roches des Alpes suisses et leur utilisation à l'analyse de la réflectivité de la croûte alpine]

Sellami, S., *Matériaux pour la Géologie de la Suisse. Geophysique,* 1994, No.28, 160p. + appends., In French with English summary. Refs. p.153-160.

Alpine landscapes, Geological surveys, Earth crust, Geologic structures, Seismic reflection, Seismic velocity, Profiles, Anisotropy, Rock properties, Classifications, Switzerland—Alps

51-5238

Use of synthetic aperture radar (SAR) for geologic reconnaissance in arctic regions: an example from the Arctic National Wildlife Refuge, Alaska.

Hanks, C.L., Guritz, R.M., *AAPG bulletin,* Jan. 1997, 81(1), p.121-134, 33 refs.

Geological surveys, Sensor mapping, Synthetic aperture radar, Spaceborne photography, Arctic landscapes, Bedrock, Lithology, Backscattering, Stratigraphy, Image processing, United States—Alaska—Arctic National Wildlife Refuge

51-5239

Interaction of basement-involved and thin-skinned tectonism in the Tertiary fold-thrust belt of central Spitsbergen, Svalbard.

Bergh, S.G., Braathen, A., Andresen, A., *AAPG bulletin,* Apr. 1997, 81(4), p.637-661, Refs. p.658-661.

Tectonics, Pleistocene, Earth crust, Arctic landscapes, Geologic processes, Rock mechanics, Deformation, Stratigraphy, Seismic reflection, Norway—Spitsbergen

51-5240

Postglacial development of a marl and peat complex on the Precambrian Shield of northwestern Ontario.

McIntyre, S.H., Duthie, H.C., Warner, B.C., *Journal of paleolimnology,* 1991, 6(2), p.141-155, Refs. p.153-155.

Limnology, Paleoecology, Paleoclimatology, Palynology, Quaternary deposits, Lacustrine deposits, Drill core analysis, Landscape development, Peat, Canada—Ontario

51-5241

Ratios of stable carbon isotopes in some High Arctic plants and lake sediments.

Blake, W., Jr., *Journal of paleolimnology,* 1991, 6(2), p.157-166, Refs. p.165-166.

Limnology, Paleoecology, Quaternary deposits, Lacustrine deposits, Carbon isotopes, Isotope analysis, Sea water, Lake water, Correlation

51-5242

Assessment of freshwater diatoms as quantitative indicators of past climatic change in the Yukon and Northwest Territories, Canada.

Pienitz, R., Smol, J.P., Birks, H.J.B., *Journal of paleolimnology,* Jan. 1995, 13(1), p.21-49, Refs. p.42-44.

Limnology, Forest tundra, Lacustrine deposits, Water chemistry, Microbiology, Biomass, Sampling, Statistical analysis, Classifications, Paleoclimatology, Surface temperature, Models, Canada—Yukon Territory, Canada—Northwest Territories

51-5243

Paleolimnological significance of observed distribution patterns of chrysophyte cysts in arctic pond environments.

Douglas, M.S.V., Smol, J.P., *Journal of paleolimnology,* Jan. 1995, 13(1), p.79-83, 30 refs.

Limnology, Paleoecology, Ponds, Bottom sediment, Arctic landscapes, Plankton, Mosses, Classifications, Plant ecology, Sampling

51-5244

Simple closure mechanism for a compact, large-diameter, gravity corer.

Boyle, J.F., *Journal of paleolimnology,* Jan. 1995, 13(1), p.85-87, 7 refs.

Limnology, Lacustrine deposits, Core samplers, Design, Performance

51-5245

Proceedings of the 53rd annual Eastern Snow Conference, Williamsburg, VA, May 2-3, 1996.

Eastern Snow Conference, Albert, M.R., ed, Taylor, S., ed, MP 4068, 213p., Refs. passim. For selected papers see 51-5246 through 51-5265.

Snow surveys, Snow cover distribution, Snowfall, Snow depth, Snowmelt, Snow hydrology, Climatic changes, Spaceborne photography, Radiometry

51-5246

Comparative look at two algorithms for mapping snow cover from Earth Observing System instruments.

Riggs, G.A., Hall, D.K., Feind, R.E., Welch, R., *Eastern Snow Conference. Proceedings,* 1996, 53rd, p.1-11, 9 refs.

Snow surveys, Snow cover distribution, Cloud cover, Terrain identification, Radiometry, Spaceborne photography, Image processing

51-5247

Evaluating snow cover over northern hemisphere lands using satellite and *in situ* observations.

Robinson, D.A., *Eastern Snow Conference. Proceedings,* 1996, 53rd, p.13-19, 23 refs.

Snow surveys, Snow cover distribution, Snow depth, Terrain identification, Climatic factors, Climatic changes, Radiometry, Spaceborne photography, Data processing

51-5248

Historical analysis of North American snow cover extent: merging satellite and station derived snow cover observations.

Hughes, M.G., Frei, A., Robinson, D.A., *Eastern Snow Conference. Proceedings,* 1996, 53rd, p.21-31, 15 refs.

Snow surveys, Snow cover distribution, Climatic changes, Climatic factors, Weather stations, Spaceborne photography, Meteorological data, Data processing, Statistical analysis

51-5249

Regional analysis of North American snow cover extent: climatic and synoptic associations from November through March.

Frei, A., Robinson, D.A., Hughes, M.G., *Eastern Snow Conference. Proceedings,* 1996, 53rd, p.33-42, 19 refs.

Snow surveys, Snow cover distribution, Climatic changes, Climatic factors, Meteorological data, Data processing, Statistical analysis

51-5250

Atlantic sea-surface temperatures and New England snowfall.

Hartley, S., *Eastern Snow Conference. Proceedings,* 1996, 53rd, p.43-53, 24 refs.

Snow surveys, Snow cover distribution, Snowfall, Marine atmospheres, Water temperature, Surface temperature, Air water interactions, Atmospheric circulation, Precipitation (meteorology), Long range forecasting, United States—New England

51-5251

Evaluation of methods for climatological reconstruction of snow depth and snow cover duration at Canadian meteorological stations.

Brown, R.D., *Eastern Snow Conference. Proceedings,* 1996, 53rd, p.55-65, 17 refs.

Snow surveys, Snow cover distribution, Snow depth, Snowfall, Atmospheric circulation, Climatic changes, Weather stations, Meteorological data, Computerized simulation, Canada

51-5252

Multicriteria analysis of satellite and airborne sensors to monitor snow cover. [Analyse multicritière de capteurs satellitaires et aéroportés pour le suivi du couvert nival]

Martin, D., *Eastern Snow Conference. Proceedings,* 1996, 53rd, p.67-81, In French with English summary. 10 refs.

Snow surveys, Snow cover distribution, Snowfall, Spaceborne photography, Image processing, Data processing, Data transmission

51-5253

Fluctuations of the terminuses of White and Thompson Glaciers, Axel Heiberg Island, N.W.T., Canada.

Cogley, J.G., Ecclestone, M.A., Adams, W.P., *Eastern Snow Conference. Proceedings,* 1996, 53rd, p.83-94, 22 refs.

Glacier surveys, Glacier oscillation, Glacier tongues, Glacier mass balance, Spaceborne photography, Photogrammetric surveys, Canada—Northwest Territories—Axel Heiberg Island

51-5254

Effects of forest on the snow parameters derived from microwave measurements during the BOREAS winter field campaign.

Chang, A.T.C., Foster, J.L., Hall, D.K., *Eastern Snow Conference. Proceedings,* 1996, 53rd, p.95-103, 31 refs.

Snow surveys, Snow cover distribution, Snow temperature, Snow hydrology, Snow water equivalent, Forest land, Forest canopy, Runoff forecasting, Spaceborne photography, Radiometry

51-5255

Winter radiation extinction and reflection in a boreal forest pine canopy.

Pomeroy, J.W., Dion, K., *Eastern Snow Conference. Proceedings,* 1996, 53rd, p.105-118, 29 refs.

Taiga, Forest land, Forest canopy, Interception, Snow air interface, Snow heat flux, Snow melting, Snow evaporation, Radiation balance, Albedo

51-5256

Snow wetness estimation from SSM/I data over varied terrain using an artificial neural network.

Sun, C., Neale, C.M.U., McDonnell, J.J., *Eastern Snow Conference. Proceedings,* 1996, 53rd, p.119-124, 16 refs.

Snow surveys, Snow temperature, Snow water content, Spaceborne photography, Radiometry, Computerized simulation

51-5257

Snow cover characterization using multiband FMCW radars.

Koh, G., Yankielun, N.E., Baptista, A.I., MP 4069, *Eastern Snow Conference. Proceedings,* 1996, 53rd, p.125-131, 7 refs.

Snow surveys, Snow cover structure, Snow stratigraphy, Snow water equivalent, Radar echoes, Radio echo soundings

The use of radars to characterize the physical properties of a snow cover offers an attractive alternative to manual snow pit measurements. Radar techniques are noninvasive and have the potential to characterize large areas of a snow-covered terrain. A promising radar technique for snow cover studies is the frequency modulated continuous wave (FMCW) radar. The use of a multiband radar approach for snow cover studies was investigated in order to fully exploit the capabilities of FMCW radars. FMCW radars operating at and near the C-, X-, and K_a-bands were used to obtain radar profiles over a wide range of snow cover conditions. These frequency-dependent radar signatures were used to identify important snow cover features such as ice and depth hoar layers. Snow grain size information was also obtained from the frequency-dependent scattering losses that were observed in the snow cover. Several case studies of FMCW radar profiles are presented in order to demonstrate the advantages of a multiband radar approach for monitoring the spatial and temporal variability of snow cover properties and/or processes over an extended area.

51-5258

Technique for the quantitative spatial analysis of sea ice melt features using low level aerial photographs.

Derksen, C.P., Piwowar, J.M., LeDrew, E.F., *Eastern Snow Conference. Proceedings,* 1996, 53rd, p.133-139, 11 refs.

Sea ice, Ice surveys, Snow ice interface, Ice surface, Ice deterioration, Ice melting, Aerial surveys

51-5259

Role of snowmelt in the January 1996 floods in the northeastern United States.

Anderson, E., Larson, L., *Eastern Snow Conference. Proceedings,* 1996, 53rd, p.141-149, 4 refs.

Snow hydrology, Snowmelt, Floods, Accidents

51-5260

Nitrate transport in snowmelt: a simple conceptual model.

Daly, D.M., *Eastern Snow Conference. Proceedings,* 1996, 53rd, p.151-162, 37 refs.

Watersheds, Snow hydrology, Snow composition, Snowmelt, Stream flow, Water chemistry, Hydrogeochemistry, Nutrient cycle

51-5261

Road salt accumulation in highway snowbanks and transport through the unsaturated zone of the Oak Ridges Moraine, southern Ontario.

Labadia, C.F., Buttle, J.M., *Eastern Snow Conference. Proceedings,* 1996, 53rd, p.163-176, 28 refs.

Road maintenance, Salting, Snow impurities, Snow composition, Snowmelt, Seepage, Soil pollution, Water pollution, Ground water, Hydrogeochemistry

51-5262

Preliminary trials of the use of immunoassay screening for chlordane in arctic sea ice cores.

Thorne, P.G., MP 4070, *Eastern Snow Conference. Proceedings,* 1996, 53rd, p.177-180, 6 refs.

Air pollution, Water pollution, Suspended sediments, Bottom sediment, Sea ice, Ice cores, Ice composition, Impurities, Meltwater, Water chemistry, Chemical analysis

Twelve ice-pack surface sediments and three ice cores taken during the 1994 AOS TransArctic Cruise were assayed for chlordane using a commercial immunoassay. The total chlordane ranged from 38 to 400 ng/g in sediments and 128 to 430 ng/L in ice. No gas chromatography/electron capture detection (GC/ECD) confirmations were performed; however, spike-recovery tests indicated that it may be possible to obtain contamination estimates for chlordane from single ice cores.

51-5263

Surface friction and stopping distance on icy roads: mean values and sample variability.

Perchanok, M.S., Comfort, G., Dinovitzer, A., *Eastern Snow Conference. Proceedings,* 1996, 53rd, p.189-193, 6 refs.

Road icing, Road maintenance, Sanding, Rubber snow friction, Rubber ice friction, Skid resistance

51-5264

Structure and metamorphism of snow crystals as revealed by low temperature scanning electron microscopy.

Wergin, W.P., Rango, A., Erbe, E.F., *Eastern Snow Conference. Proceedings,* 1996, 53rd, p.195-204, 24 refs.

Metamorphism (snow), Snow crystal structure, Ice crystal replicas, Scanning electron microscopy

51-5265

Inferring dynamic winter variables.

Hogan, A.W., MP 4071, *Eastern Snow Conference. Proceedings,* 1996, 53rd, p.205-212, 8 refs.

Snowfall, Snow depth, Snow air interface, Snow heat flux, Snow cover effect, Air temperature, Soil temperature, Statistical analysis

A majority of winter environmental data is measured or observed at meteorological or hydrological stations that coexist with other activities. It is often necessary to infer the air, snow, or ground temperature in a natural setting from the observations available at these stations. There are dynamic exchanges of heat, chemicals and water substances in natural settings that are quite complex. There is exchange near treetop level, at the air/snow interface, and at the snow/ground interface. These exchanges interact on differing times

scales, making it difficult to synthesize the overall response to a dynamic change in the troposphere above. Air, snow, and soil temperatures have been measured at the margin of a regenerating forest for several winters. This paper examines spatial, temporal, and dimensionless scaling of winter temperatures. An interesting preliminary result is the response of the environment to some statistical "outliers" in the temperature of the air above the snow. The use of the proposed scaling methods to examine the sudden loss of New England snow coincident with heavy Pennsylvania rains described by the keynote speakers has been added to the paper.

51-5266

Mercurial storms rage in the Arctic.

Pearce, F., *New scientist,* June 21, 1997, 154(2087), p.17.

Polar atmospheres, Atmospheric boundary layer, Air pollution, Gases, Metals, Phase transformations, Environmental impact, Sampling

51-5267

Numerical simulation of the freezing process of biological tissues.

Shirakashi, R., Tanasawa, I., *Heat transfer—Japanese research,* 1995, 24(4), p.342-355, 10 refs.

Cryobiology, Preserving, Solutions, Liquid cooling, Cooling rate, Thermal diffusion, Heat transfer, Mass transfer, Thermodynamic properties, Solidification, Mathematical models, Simulation

51-5268

Long-term variations in insolation and their effects on climate, the LLN experiments.

Berger, A., Loutre, M.F., *Surveys in geophysics,* May 1997, 18(2-3), p.147-161, Refs. p.158-161.

Pleistocene, Paleoclimatology, Climatic changes, Insolation, Greenhouse effect, Ice sheets, Glacier oscillation, Ice volume, Carbon dioxide, Models, Ice age theory

51-5269

Natural magnetic archives of past global change.

Evans, M.E., Heller, F., Bloemendal, J., Thouveny, N., *Surveys in geophysics,* May 1997, 18(2-3), p.183-196, Refs. p.194-196.

Paleoclimatology, Geomagnetism, Rock magnetism, Global change, Polarization (charge separation), Quaternary deposits, Marine deposits, Loess, Lacustrine deposits, Diagenesis

51-5270

Mantle viscosity, glacial isostatic adjustment and the eustatic level of the sea.

Peltier, W.R., Jiang, X.H., *Surveys in geophysics,* May 1997, 18(2-3), p.239-277, Refs. p.276-277.

Paleoclimatology, Global change, Global warming, Geologic processes, Isostasy, Ice melting, Viscosity, Sea level, Tides, Carbon isotopes, Isotope analysis, Mathematical models

51-5271

Predictions of crustal deformation caused by changing polar ice on a viscoelastic Earth.

Wahr, J., Han, D.Z., *Surveys in geophysics,* May 1997, 18(2-3), p.303-312, 17 refs.

Earth crust, Isostasy, Glacial geology, Ice loads, Ice cover effect, Deformation, Viscoelasticity, Gravity, Models

Changes in polar ice could cause vertical crustal motion along the edge of the Greenland and antarctic ice caps. Measurements of the uplift could help constrain the changing ice volumes. The problem is complicated by the Earth's visco-elastic response to past loading, including the Late Pleistocene deglaciation. A method is described for removing these visco-elastic effects, by using simultaneous measurements of vertical motion and surface gravity. A linear combination of these two measurement types can be formed which is relatively independent of visco-elastic effects, and which can be interpreted in terms of present-day fluctuations in ice. (Auth. mod.)

51-5272

Mass balance of polar ice from long wavelength features of the Earth's gravitational field.

Trupin, S.A., Panfili, R.P., *Surveys in geophysics,* May 1997, 18(2-3), p.313-326, 31 refs.

Geophysical surveys, Glacier surveys, Sea level, Geodetic surveys, Glacier thickness, Glacier mass balance, Glacier melting, Isostasy, Ice loads, Gravity, Viscosity

Satellite solutions to the low degree zonal harmonics of the Earth's gravitational potential, and rates of surface accumulation are used to partially constrain, by means of repeated forward solution, the time rates of thickness change over the Antarctic and Greenland Ice Sheets. The sign of the slope of the low degree zonal coefficients versus sea level contribution for Greenland is positive, but for Antarctica the sign of the slope is positive for even degree and negative for odd degree harmonics. By using this property of the zonal coefficients, it is possible to determine the individual sea level contributions for Greenland and Antarctica. (Auth. mod.)

51-5273

Annual sea level variability induced by changes in sea ice extent and accumulation on ice sheets: an assessment based on remotely sensed data.

Zwally, H.J., Giovinetto, M.B., *Surveys in geophysics,* May 1997, 18(2-3), p.327-340, 28 refs.

Oceanography, Sea level, Glacier mass balance, Remote sensing, Sea ice distribution, Moisture transfer, Statistical analysis, Correlation, Ice cover effect, Air ice water interaction, Climatic factors

Changes of mean annual net accumulation at the surface on the grounded ice sheets of East Antarctica, West Antarctica and Greenland in response to variations in sea ice extent are estimated using grid-point values 100 km apart. The data bases are assembled principally by bilinear interpolation of remotely sensed brightness temperature, surface temperature, and surface elevation. Stepwise correlation analyses indicate that variations in sea ice extent of ±50 km would lead to changes in accumulation inversely of ±4% on East Antarctica, ±10% on West Antarctica, and ±4% on Greenland. These results substantiate the findings for the antarctic ice sheets and suggest a reduction by one half of the probable change of accumulation on Greenland. (Auth. mod.)

51-5274

Multi-thermal model of cumulus glaciation via the Hallett-Mossop process.

Blyth, A.M., Latham, J., *Royal Meteorological Society. Quarterly journal A,* July 1997, 123(541), p.1185-1198, 30 refs.

Clouds (meteorology), Cloud physics, Ice crystal growth, Snow pellets, Snow crystal growth, Icing rate, Particle size distribution, Models

51-5275

Physically based scheme for the treatment of stratiform clouds and precipitation in large-scale models. I: Description and evaluation of the microphysical processes.

Rotstayn, L.D., *Royal Meteorological Society. Quarterly journal A,* July 1997, 123(541), p.1227-1282, Refs. p.1277-1282.

Precipitation (meteorology), Clouds (meteorology), Cloud physics, Cloud dissipation, Ice crystals, Particle size distribution, Ice sublimation, Ice vapor interface, Water content, Mathematical models, Weather forecasting

51-5276

Sensitivity of ozone and temperature to vertical resolution in a GCM with coupled stratospheric chemistry.

Austin, J., Butchart, N., Swinbank, R., *Royal Meteorological Society. Quarterly journal A,* July 1997, 123(541), p.1405-1431, Refs. p.1428-1431.

Climatology, Atmospheric circulation, Stratosphere, Ozone, Distribution, Air temperature, Polar stratospheric clouds, Cloud physics, Photochemical reactions, Models, Simulation

51-5277

Algae-copepod-fish link associated with antarctic sea ice.

Hoshiai, T., Tanimura, A., Watanabe, K., Fukuchi, M., Marine biology. Its accomplishment and future prospect. Edited by J. Mauchline and T. Nemoto, Amsterdam, Elsevier, 1991, p.237-246, 18 refs.

DLC QH91.A1M352 1991

Marine biology, Algae, Sea ice, Ecology, Biomass, Antarctica—Showa Station

In the Showa Station area the proliferation of ice algae at the bottom of the sea ice occurred in autumn and spring. The calanoid copepod, *Paralabidocera antarctica* appeared as a prominent component of ice meiofauna in autumn and persisted through the winter. Growth of this species began in and followed the autumnal ice algal peak and occurred simultaneously with the spring algal peak. Analysis of gut contents showed that the copepod fed on ice algae. Stomach contents of fry of the nototheniid fish, *Pagothenia borchgrevinki* which were caught beneath the ice in winter contained nauplii of *P. antarctica* with other zooplankters. It is concluded that *P. antarctica* functions as a conveyer of ice algal primary production to such higher consumers as *P. borchgrevinki* in the antarctic coastal ecosystem. (Auth.)

51-5278

Marine ecology of polar seas: a comparison Arctic/Antarctic.

Strömberg, J.O., Marine biology. Its accomplishment and future prospect. Edited by J. Mauchline and T. Nemoto, Amsterdam, Elsevier, 1991, p.247-261, Refs. p.260-261.

DLC QH91.A1M352 1991

Marine biology, Ecology, Biomass, Plankton, Seasonal variations, Polar regions, Ocean currents, Ocean bottom, Sea ice

An Antarctic-Arctic comparison is made of the polar seas and their biology, hydrography, sea ice and its associated flora and fauna, phytoplankton, zooplankton and benthos. It is noted that recent deep faunal samples from the Antarctic seem to be very rich, although the general composition of the macrozoobenthos does not seem to be very different between the two poles. Thus, it is concluded that the structure of the benthic ecosystems, as evolved in the two hemispheres, is rather similar.

51-5279

Late-Holocene light-ring chronologies from subfossil black spruce stems in mires of subarctic Québec.

Lavoie, C., Payette, S., *Holocene,* June 1997, 7(2), p.129-137, 41 refs.

Paleoecology, Forest tundra, Trees (plants), Growth, Peat, Permafrost, Forest lines, Statistical analysis, Quaternary deposits, Radioactive age determination, Canada—Quebec

51-5280

Fine-resolution palaeoclimatic reconstruction of the last 2000 years, from Lake Keilambete, southeastern Australia.

Mooney, S., *Holocene,* June 1997, 7(2), p.139-149, Refs. p.148-149.

Paleoclimatology, Climatic changes, Lacustrine deposits, Quaternary deposits, Palynology, Remanent magnetism, Sedimentation, Radioactive age determination, Australia—Keilambete, Lake

51-5281

Mid- and late-Holocene limnogeology of Laguna de Negro Francisco, northern Chile, and its palaeoclimatic implications.

Grosjean, M., et al, *Holocene,* June 1997, 7(2), p.151-159, 20 refs.

Paleoclimatology, Climatic changes, Moisture transfer, Limnology, Sedimentation, Lacustrine deposits, Quaternary deposits, Geochronology, Radioactive age determination, Geochemistry, Chile—Laguna del Negro Francisco

51-5282

Sedimentary records of the extent and impact of atmospheric contamination from a remote Siberian highland lake.

Flower, R.J., Politov, S.V., Rippey, B., Rose, N.L., Appleby, P.G., Stevenson, A.C., *Holocene,* June 1997, 7(2), p.161-173, Refs. p.171-173.

Limnology, Lacustrine deposits, Sampling, Air pollution, Environmental impact, Aerosols, Palynology, Metals, Statistical analysis, Correlation, Russia—Siberia

51-5283

Water content of lake sediments and its relationship to other physical parameters: an alpine case study.

Menounos, B., *Holocene,* June 1997, 7(2), p.207-212, 26 refs.

Limnology, Alpine landscapes, Lacustrine deposits, Organic soils, Geochemistry, Drill core analysis, Water content, Stratigraphy, Statistical analysis, Correlation

51-5284

International Tree-Ring Data Bank: an enhanced global database serving the global scientific community.

Grissino-Mayer, H.D., Fritts, H.C., *Holocene,* June 1997, 7(2), p.235-238, 8 refs.

Paleoclimatology, Trees (plants), Growth, Age determination, Research projects, Organizations

51-5285

Thawing of the active layer on the coastal plain of the Alaskan Arctic.

Romanovsky, V.E., Osterkamp, T.E., *Permafrost and periglacial processes,* Jan.-Mar. 1997, 8(1), p.1-22, With French summary. 40 refs.

Permafrost transformation, Permafrost thermal properties, Frozen ground temperature, Active layer, Thaw depth, Thermal conductivity, Seasonal freeze thaw, Analysis (mathematics), Indexes (ratios), United States—Alaska

51-5286

Freezing of the active layer on the coastal plain of the Alaskan Arctic.

Osterkamp, T.E., Romanovsky, V.E., *Permafrost and periglacial processes,* Jan.-Mar. 1997, 8(1), p.23-44, With French summary. 56 refs.

Permafrost thermal properties, Soil temperature, Active layer, Freezeup, Soil freezing, Freezing front, Unfrozen water content, Frozen ground thermodynamics, Temperature measurement, Mathematical models, Thermal diffusion, United States—Alaska

51-5287

Effects of climate on the active layer and permafrost on the North Slope of Alaska, U.S.A.

Zhang, T., Osterkamp, T.E., Stamnes, K., *Permafrost and periglacial processes,* Jan.-Mar. 1997, 8(1), p.45-67, With French summary. 66 refs.

Climatology, Climatic changes, Permafrost transformation, Active layer, Thaw depth, Depth hoar, Surface temperature, Permafrost thermal properties, Thermal regime, Freezing indexes, Seasonal variations, Mathematical models, Snow cover effect, United States—Alaska—North Slope

51-5288

Rock temperatures and implications for cold region weathering. I: new data from Viking Valley, Alexander Island, Antarctica.

Hall, K., *Permafrost and periglacial processes,* Jan.-Mar. 1997, 8(1), p.69-90, With French summary. 43 refs.

Geocryology, Permafrost weathering, Rock properties, Frozen rock temperature, Thermal stresses, Temperature measurement, Temperature variations, Antarctica—Viking Valley

Data provided for the best part of two antarctic winters and one summer, from a variety of positions within a dry valley, show the dangers of using air temperature as a surrogate for thermal conditions either at the rock surface or at depth in the rock. Observation and nondestructive ultrasonic testing shows that water is extremely limited during the period of freeze-thaw cycles. Thus, despite the occurrence of the thermal events no damage can result from frost action. Detailed data at two minute intervals show the importance of such high resolution observations. It is not possible to discern the weathering regime, including interpreting the freeze-thaw process. Beyond anything else, this paper indicates the complexity of rock temperature regimes and suggests that it is the synergistic relationships between different weathering processes that are important. (Auth. mod.)

51-5289

Critical degree of saturation as a threshold moisture level in frost weathering of limestones.

Prick, A., *Permafrost and periglacial processes,* Jan.-Mar. 1997, 8(1), p.91-99, With French summary. 36 refs.

Periglacial processes, Rock mechanics, Geocryology, Frost weathering, Water content, Saturation, Porosity, Freeze thaw cycles, Lithology, Shear modulus, Mechanical tests

51-5290

Distribution of mountain permafrost, Fontanesses Basin, Valaisian Alps, Switzerland.

Gardaz, J.M., *Permafrost and periglacial processes,* Jan.-Mar. 1997, 8(1), p.101-105, With French summary. 21 refs.

Permafrost distribution, Mountain soils, Discontinuous permafrost, Detection, Soil temperature, Active layer, Rock glaciers, Snow cover effect, Sounding, Electrical resistivity, Switzerland—Alps

51-5291

Cyclic development and thermokarstic degradation of palsas in the mid-alpine zone at Leirpullan, Dovrefjell, southern Norway.

Matthews, J.A., Dahl, S.O., Berrisford, M.S., Nesje, A., *Permafrost and periglacial processes,* Jan.-Mar. 1997, 8(1), p.107-122, With French summary. 65 refs.

Permafrost transformation, Frost mounds, Periglacial processes, Degradation, Thermokarst development, Geomorphology, Landforms, Stratigraphy, Norway—Dovrefjell

51-5292

Monitoring of mountain permafrost in the Central Andes, Cordon del Plata, Mendoza, Argentina.

Trombotto, D., Buk, E., Hernández, J., *Permafrost and periglacial processes,* Jan.-Mar. 1997, 8(1), p.123-129, With French summary. 18 refs.

Periglacial processes, Discontinuous permafrost, Permafrost distribution, Soil temperature, Rock glaciers, Geomorphology, Landforms, Argentina—Andes

51-5293

***In situ* effects of elevated CO_2 on the carbon and nitrogen status of alpine plants.**

Schäppi, B., Körner, C., *Functional ecology,* June 1997, 11(3), p.290-299, 49 refs.

Plant ecology, Alpine landscapes, Grasses, Ecosystems, Vegetation patterns, Plant tissues, Plant physiology, Carbon dioxide, Nutrient cycle, Decomposition, Microclimatology

51-5294

Causes of inherently slow growth in alpine plants: an analysis based on the underlying carbon economies of alpine and lowland *Poa* species.

Atkin, O.K., Botman, B., Lambers, H., *Functional ecology,* Dec. 1996, 10(6), p.698-707, Refs. p.705-707.

Plant ecology, Alpine landscapes, Growth, Plant physiology, Photosynthesis, Biomass, Carbon dioxide, Altitude, Simulation

51-5295

Premature dehardening in *Vaccinium myrtillus* during a mild winter: a cause for winter dieback?

Ögren, E., *Functional ecology,* Dec. 1996, 10(6), p.724-732, 24 refs.

Plant ecology, Plant physiology, Acclimatization, Snow cover effect, Frost resistance, Cold tolerance, Air temperature, Damage, Seasonal variations, Temperature effects

51-5296

Influence of freeze-thaw cycles on the compressive strength of stabilized FGD sludges.

Chen, X.Y., Wolfe, W.E., Hargraves, M.D., *Fuel,* June 1997, 76(8), p.755-759, 5 refs.

Sludges, Waste disposal, Compaction, Strength, Stress strain diagrams, Compressive properties, Freeze thaw cycles, Freeze thaw tests, Water content

51-5297

Injury of biological tissue by extracellular freezing.

Ujihira, M., Yamaguchi, R., Aizawa, N., Tanishita, K., *Heat transfer—Japanese research,* 1995, 24(5), p.457-475, 19 refs.

Cryobiology, Preserving, Damage, Permeability, Ice prevention, Solutions, Chemical properties, Viability, Low temperature research, Temperature control

51-5298

Balloon-borne continuous cloud particle replicator for measuring vertical profiles of cloud microphysical properties: instrument design, performance, and collection efficiency analysis.

Miloshevich, L.M., Heymsfield, A.J., *Journal of atmospheric and oceanic technology,* Aug. 1997, 14(4), p.753-768, 21 refs.

Cloud physics, Profiles, Meteorological instruments, Radio echo soundings, Probes, Ice crystal structure, Cloud droplets, Replicas, Design, Design criteria, Performance

51-5299

Retrieval of kinematic fields using a single-beam airborne Doppler radar performing circular trajectories.

Protat, A., LeMaitre, Y., Scialom, G., *Journal of atmospheric and oceanic technology,* Aug. 1997, 14(4), p.769-791, 28 refs.

Precipitation (meteorology), Classifications, Airborne radar, Radar echoes, Sounding, Profiles, Reflectivity, Ice detection, Snow pellets, Simulation

51-5300

Possible improvement of the ice and thermal conditions in the lower pool of the Krasnoyarsk hydroelectric station.

Gotlib, IA.L., *Hydrotechnical construction,* June 1997, 30(12), p.728-731, Translated from Gidrotekhnicheskoe stroitel'stvo. 10 refs.

Electric power, Reservoirs, Thermal regime, Water temperature, Temperature control, Ice formation, Ice edge, Ice control

51-5301

Column amounts of $ClONO_2$, HCl, HNO_3, and HF from ground-based FTIR measurements made near Kiruna, Sweden, in late winter 1994.

Blumenstock, T., Fischer, H., Friedle, A., Hase, F., Thomas, P., *Journal of atmospheric chemistry,* Mar. 1997, 26(3), p.311-321, 13 refs.

Climatology, Polar atmospheres, Chemical composition, Stratosphere, Degradation, Ozone, Aerosols, Infrared spectroscopy, Photochemical reactions, Seasonal variations, Sweden—Kiruna

51-5302

Potential influence of $ClO\cdot O_2$ on stratospheric ozone depletion chemistry.

Shindell, D.T., *Journal of atmospheric chemistry,* Mar. 1997, 26(3), p.323-335, 24 refs.

Climatology, Polar atmospheres, Ozone, Stratosphere, Aerosols, Degradation, Chemical composition, Models

The author examines the implications of proposed $ClO\cdot O_2$ chemistry, calculating the abundance of $ClO\cdot O_2$ in equilibrium with typical measured values of enhanced ClO within the antarctic polar vortex. A stable $ClO\cdot O_2$ compound creates a significant chlorine reservoir, while fairly rapid dimer formation greatly increases the $[Cl_2O_2]/[ClO]$ ratio. It is shown that one or both of the steps whereby ClO forms Cl_2O_2 via $ClO\cdot O_2$ must proceed fairly slowly. Ozone depletion rates are then calculated based on these constraints. (Auth. mod.)

51-5303

Ecological processes in a cold desert ecosystem: the abundance and species distribution of algal mats in glacial meltwater streams in Taylor Valley, Antarctica.

Alger, A.S., et al, *University of Colorado. Institute of Arctic and Alpine Research. Occasional paper,* 1997, No.51, 108p., Refs. p.34-36.

Limnology, Algae, Biomass, Classifications, Ecology, Meltwater, Glacier melting, Streams, Water chemistry, Antarctica—Taylor Valley

This report presents results on the abundance and species distribution of algal mats at 16 stream sites in Taylor Valley. Results indicate that species of filamentous cyanobacteria are the most abundant algae in the dry valley streams. Algal mats were classified on the basis of on apparent color into 4 mat types. "Black-colored algae" were found in the wetted zone adjacent to the streambed and were primarily composed of *Nostoc.* "Green-colored algae" were found attached to the surface/undersurface of rocks in the main stream channel and were mainly composed of *Prasiola.* "Orange-colored" and "red-colored algae" occurred in the streambed regions with the greatest flow and had a greater diversity of species. The abundance of algal mats is controlled by sediment transport and the characteristics of the streambed. Algal mats were more abundant in streams where the streambed is composed of a stone pavement. In streams with abundant algal mats, the nutrient concentrations are lower than in streams with sparse algal mats. (Auth. mod.)

51-5304

Siberia 1971: a report on the visit of the Honourable Jean Chrétien, Minister of Indian Affairs and Northern Development and Official Delegation to the Soviet Union, July-August 1971.

Slipchenko, W., Ottawa, Indian and Northern Affairs, 1971, 124p., Refs. passim.

Economic development, Urban planning, Natural resources, International cooperation, Cold weather operation, Russia—Siberia

51-5305

Biosolids and sludge management.
Krogmann, U., Boyles, L.S., Martel, C.J., McComas, K.A., MP 4072, *Water environment research*, 1997, 69(4), p.534-550, Refs. p.545-550.
Waste treatment, Water treatment, Waste disposal, Sludges, Earth fills, Environmental protection, Bibliographies
This paper summarizes recent research on wastewater sludge and biosolids use in international waste disposal management practices.

51-5306

Millennial-scale climatic oscillations during the last interglaciation in central China.
An, Z.S., Porter, S.C., *Geology*, July 1997, 25(7), p.603-606, 29 refs.
Pleistocene, Paleoclimatology, Precipitation (meteorology), Climatic changes, Loess, Stratigraphy, Wind factors, Dust, Geochronology, Correlation, China

51-5307

High-resolution record of foraminiferal response to late Quaternary sea-ice retreat in the Norwegian-Greenland Sea.
Nees, S., Altenbach, A.V., Kassens, H., Thiede, J., *Geology*, July 1997, 25(7), p.659-662, 36 refs.
Pleistocene, Marine deposits, Paleoecology, Biomass, Nutrient cycle, Glacier oscillation, Sea ice distribution, Ice melting, Ice edge, Drill core analysis, Stratigraphy, Greenland Sea, Norwegian Sea

51-5308

Accumulation at the surface of polar ice sheets: observation and modelling for global climate change.
Genthon, C., Jouzel, J., Déqué, M., NATO Advance Research Workshop on Global Precipitations and Climate Change, l'Agelonde, France, Sep. 27-Oct. 1, 1993. Proceedings. Edited by M. Debois et al and NATO ASI, Series I. Global Environmental Change. Vol.26, Berlin, Springer-Verlag, 1994, p.53-75, Refs. p.71-75.
DLC QC925.G56
Paleoclimatology, Climatic changes, Global change, Snow accumulation, Glacier mass balance, Ice sheets, Sea level, Simulation, Weather forecasting
Precipitation change over Greenland or Antarctica might have truly global environmental impact because it can affect the balance of water between the ocean and the ice sheets, and therefore the global sea level. General Circulation Models (GCMs) of the atmosphere are popular tools to study the components of a climate change. Yet they are not altogether successful in the polar regions. Models spatial resolution is one important limitation of models performances, particularly at regional scales. This paper shows how going from rather coarse to very fine resolution helps improve the simulation of net annual mean accumulation (precipitation minus evaporation/sublimation) at the surface of Greenland and Antarctica in the Météo-France Arpège GCM. (Auth. mod.)

51-5309

Split-window retrieval of particle size and optical depth in contrails located above horizontally inhomogeneous ice clouds.
Duda, D.P., Spinhirne, J.D., *Geophysical research letters*, Dec. 15, 1996, 23(25), p.3711-3714, 12 refs.
Cloud physics, Air pollution, Condensation trails, Aerosols, Radiometry, Particle size distribution, Optical properties, Ice crystal optics, Radiance

51-5310

Approximate calculations of thaw depth in permafrost beneath a building of complex configuration.
Khrustalev, L.N., Emel'ianova, L.V., *Soil mechanics and foundation engineering*, May 1997, 33(6), p.213-216, Translated from Osnovaniia, fundamenty i mekhanika gruntov. 3 refs.
Permafrost beneath structures, Frozen ground mechanics, Ground thawing, Thaw depth, Design criteria, Stefan problem, Analysis (mathematics)

51-5311

Thermal protection of soil base at construction site of the Vilyui-III hydroelectric plant.
Bondarenko, A.G., Starshinov, S.N., *Hydrotechnical construction*, Apr. 1997, 30(10), p.600-605, Translated from Gidrotekhnicheskoe stroitel'stvo. 3 refs.
Electric power, Dams, Concrete slabs, Foundations, Cold weather construction, Soil freezing, Temperature control, Frost protection, Electric heating, Mechanical tests

51-5312

B-1, 3-glucanase is cryoprotective in vitro and is accumulated in leaves during cold acclimation.
Hincha, D.K., Meins, F., Jr., Schmitt, J.M., *Plant physiology*, July 1997, 114(3), p.1077-1083, Refs. p.1082-1083.
Plant physiology, Cryobiology, Acclimatization, Antifreezes, Plant tissues, Solubility, Freeze thaw cycles, Damage, Protection, Chemical analysis

51-5313

Fire and ice of the Vatnajökull Glacier: a potent cocktail.
Kaldal, J., *Iceland review—nature and travel*, 1996, 34(4), p.8-14.
Volcanoes, Glaciology, Explosion effects, Volcanic ash, Ice sheets, Glacier melting, Subglacial observations, Iceland—Vatnajökull Glacier

51-5314

Role of the oceanic heat transport in climate dynamics—a sensitivity study with an atmospheric general circulation model.
Cohen-Solal, E., Le Treut, H., *Tellus*, May 1997, 49A(3), p.371-387, Refs. p.386-387.
Climatology, Oceanography, Marine atmospheres, Radiant heating, Heat flux, Turbulent diffusion, Sea ice, Air ice water interaction, Atmospheric circulation, Ice cover effect, Thermodynamics, Simulation

51-5315

Atmospheric meridional circulation impacts on contrasting winter sea ice extent in two years in the Pacific sector of the southern ocean.
Harangozo, S.A., *Tellus*, May 1997, 49A(3), p.388-400, 27 refs.
Oceanography, Sea ice distribution, Ice growth, Ice melting, Seasonal variations, Air ice water interaction, Atmospheric circulation, Advection, Air temperature, —South Pacific Ocean
An explanation is sought for the marked variation in maximum sea ice extent observed between 2 years in the 2 areas of greatest interannual variability in winter ice extent in the South Pacific sector of the southern ocean surrounding Antarctica. The role of ice recession in controlling ice extent is highlighted, and the adjustments in the near-surface atmospheric meridional circulation and air temperature that attend winter periods of ice retreat and advance are noted. Systematic meridional circulation changes also take place during the development and over the duration of ice extent anomalies. These are shown to emanate from adjustments of the semi-annual cycle in the extra-tropical South Pacific atmospheric circulation. (Auth. mod.)

51-5316

ERS/VLBI Station O'Higgins in Antarctica.
Hase, H., Nothnagel, A., *Bonn. Rheinischen Friedrich-Wilhelms-Universität. Geodätisches Institut. Mitteilungen*, 1993, No.81, Working Meeting on European VLBI for Geodesy and Astrometry, 9th, Bad Neuenahr, Germany, Sep. 30-Oct. 1, 1993. Proceedings. Edited by J. Campbell and A. Nothnagel, p.87-97, 1 ref.
DLC QB296.E9W67 1993
Research projects, Geodetic surveys, Electronic equipment, Remote sensing, Tectonics, Data processing, Geodesy, Experimentation, Antarctica—Bernardo O'Higgins Station
The antarctic ERS/VLBI-Station O'Higgins performed the first successful geodetic VLBI experiments during the burst in Jan.-Feb. 1993. The facility is introduced and the first results are presented. (Auth.)

51-5317

Interaction of HNO_3 with water-ice surfaces at temperatures of the free troposphere.
Abbatt, J.P.D., *Geophysical research letters*, June 15, 1997, 24(12), p.1479-1482, 19 refs.
Climatology, Cloud physics, Aerosols, Stratosphere, Ice vapor interface, Adsorption, Scavenging, Temperature effects, Simulation

51-5318

Role of sea ice in $2XCO_2$ climate model sensitivity: part II: hemispheric dependencies.
Rind, D., Healy, R., Parkinson, C., Martinson, D., *Geophysical research letters*, June 15, 1997, 24(12), p.1491-1494, 5 refs.
Climatology, Climatic factors, Sea ice distribution, Ice cover thickness, Carbon dioxide, Ice air interface, Ice cover effect, Air temperature, Simulation
The sensitivity of doubled CO_2 simulations to GCM control-run sea ice thickness and extent is examined in a series of 10 control-run simulations with different sea ice and corresponding doubled CO_2 simulations. Results show that with increased control-run sea ice coverage in the Southern Hemisphere, temperature sensitivity with climate change is enhanced, while there is little effect on temperature sensitivity of (reasonable) variations in control-run sea ice thickness. Overall, the Southern Hemisphere sea ice coverage change had a large impact on global temperature, because Northern Hemisphere sea ice was sufficiently thick to limit its response to doubled CO_2, and sea ice changes generally occurred at higher latitudes, reducing the sea ice-albedo feedback. In both these experiments the model displayed a sensitivity of ca. 0.02°C global warming per percent change in Southern Hemisphere sea ice coverage. (Auth. mod.)

51-5319

Spatial variations in the rate of sea level rise caused by the present-day melting of glaciers and ice sheets.
Conrad, C.P., Hager, B.H., *Geophysical research letters*, June 15, 1997, 24(12), p.1503-1506, 14 refs.
Oceanography, Sea level, Ice sheets, Glacier melting, Meltwater, Tides, Geodetic surveys, Accuracy
The redistribution of surface water mass associated with the melting of glacial ice in both the Arctic and Antarctic causes uplift near areas of mass depletion, depression of the seafloors, and changes in the earth's gravitational field which perturb the ocean surface. As a result, local spatial variations exist in the rate of sea level rise. Because most long duration tide gauges are in the Northern Hemisphere, if the sources of sea level rise are unbalanced between the two hemispheres, estimates of global sea level rise could be in error by 10 to 20%. Individual tide gauges could be more seriously unrepresentative if they are near regions of significant present-day mass depletion. (Auth. mod.)

51-5320

Effects of the water flow through the Canadian Archipelago in a global ice-ocean model.
Goosse, H., Fichefet, T., Campin, J.M., *Geophysical research letters*, June 15, 1997, 24(12), p.1507-1510, 14 refs.
Oceanography, Ocean currents, Water flow, Salinity, Ventilation, Mathematical models, Ice cover effect, Arctic Ocean

51-5321

Water and wastewater quality monitoring, McMurdo Station, Antarctica.
Crockett, A.B., *Environmental monitoring and assessment*, Aug. 1997, 47(1), p.39-57, 17 refs.
Cold weather operation, Waste disposal, Sewage disposal, Sea water, Water pollution, Environmental impact, Sea ice, Ice composition, Algae, Environmental impact, Environmental tests, Antarctica—McMurdo Station
Wastewater from McMurdo Station, which has a population that ranges from 250 to 1200 people, is macerated, is sometimes mixed with waste brine from the desalinization plant and is discharged to McMurdo Sound. Effluent water quality has been routinely monitored since 1989. Results of the effluent monitoring efforts show that low concentrations of a few organic contaminants have been detected, while concentrations of metals, particularly copper, are considerably higher. Ambient water quality and sea ice monitoring detected very few contaminants, all at very low levels. Diatom communities near the outfall differ in relative abundance, cell counts, and chlorophyll *a* content compared to control sites. For the purpose of evaluating the impact of McMurdo's effluent on ambient water quality, improved effluent monitoring and sediment quality monitoring are recommended instead of frequent monitoring of ambient water quality. (Auth. mod.)

51-5322

Multiple orders of relative sea-level changes in earliest Cambrian passive-margin succession, Mackenzie Mountains, northwestern Canada.
MacNaughton, R.B., Dalrymple, R.W., Narbonne, G.M., *Journal of sedimentary research*, July 1997, 67(4), p.622-637, 56 refs.
Pleistocene, Sea level, Subpolar regions, Earth crust, Quaternary deposits, Sedimentation, Stratigraphy, Lithology, Periodic variations, Correlation, Geochronology, Canada—Northwest Territories—Mackenzie Mountains

51-5323

Snow load on buildings.
O'Rourke, M.J., *American scientist*, Jan.-Feb. 1997, 85(1), p.64-70, 9 refs.
Buildings, Structural analysis, Roofs, Snowfall, Snow loads, Snowdrifts, Design criteria, Statistical analysis, Simulation, Mechanical tests, Snow cover effect, Wind factors

51-5324

Effect of root temperature on the induction of nitrate reductase activities and nitrogen uptake rates in arctic plant species.

Atkin, O.K., Cummins, W.R., *Plant and soil,* Feb. 1994, 159(2), 187-197, Refs. p.195-197.

Plant physiology, Roots, Nutrient cycle, Growth, Low temperature tests, Temperature effects, Chemical analysis, Simulation, Statistical analysis

51-5325

Preferred crystallographic orientation in the ice I→II transformation and the flow of ice II.

Bennett, K., Wenk, H.R., Durham, W.B., Stern, L.A., Kirby, S.H., *Philosophical magazine A,* Aug. 1997, 76(2), p.413-435, 46 refs.

Ice physics, Ice crystal structure, Deuterium oxide ice, Phase transformations, Orientation, Plastic flow, Neutron diffraction, Ice microstructure, Ice deformation, High pressure tests, Mechanical tests

51-5326

Responses of soil microbiota of a late successional alpine grassland to long term CO_2 enrichment.

Niklaus, P.A., Körner, C., *Plant and soil,* 1996, 184(2), p.219-229, Refs. p.228-229.

Plant ecology, Soil microbiology, Ecosystems, Alpine landscapes, Grasses, Biomass, Carbon dioxide, Nutrient cycle, Soil analysis, Statistical analysis

51-5327

Effects of freezing on rhizosphere and root nutrient content using two soil sampling methods.

Clemensson-Lindell, A., Persson, H., *Plant and soil,* Jan. 1992, 139(1), P.39-45, 22 refs.

Plant physiology, Roots, Nutrient cycle, Soil freezing, Cold storage, Soil chemistry, Sampling, Chemical analysis, Temperature effects, Laboratory techniques, Accuracy

51-5328

Small ice caps in climate models.

North, G.R., Kin, K.Y., Lee, W.H., NATO Advanced Study Institute on the Mathematics of Models for Climatology and Environment, Puerto de la Cruz, Tenerife, Spain, Jan. 11-21, 1995. Proceedings. Edited by J.I. Díaz and NATO ASI, Series I. Global Environmental Change. Vol.48, Berlin, Springer-Verlag, 1997, p.289-297, 16 refs.

DLC QC981.M427

Climatology, Climatic changes, Ice sheets, Radiation balance, Ice cover effect, Albedo, Insolation, Thermal diffusion, Surface temperature, Mathematical models

51-5329

Glaciers and ice sheets.

Fowler, A.C., NATO Advanced Study Institute on the Mathematics of Models for Climatology and Environment, Puerto de la Cruz, Tenerife, Spain, Jan. 11-21, 1995. Proceedings. Edited by J.I. Díaz and NATO ASI, Series I. Global Environmental Change. Vol.48, Berlin, Springer-Verlag, 1997, p.301-336, Refs. p.334-336.

DLC QC981.M427

Glaciology, Ice sheets, Glacier flow, Ice mechanics, Viscosity, Sliding, Glacier surges, Lake bursts, Ice solid interface, Icebergs, Mathematical models

51-5330

Cover—ERS-1/2 SAR monitoring of dangerous ice phenomena along the western part of Northern Sea Route.

Johannessen, O.M., et al, *International journal of remote sensing,* Aug. 1997, 18(12), p.2477-2481, 2 refs.

Sea ice distribution, Ice surveys, Ice conditions, Sensor mapping, Spaceborne photography, Synthetic aperture radar, Route surveys, Ice navigation, Ice edge, Safety, Northern Sea Route

51-5331

Model-based interpretation of ERS-1 SAR images of arctic sea ice.

Beaven, S.G., Gogineni, S.P., Tjuatja, S., Fung, A.K., *International journal of remote sensing,* Aug. 1997, 18(12), p.2483-2503, 19 refs.

Sea ice distribution, Ice surveys, Freezeup, Detection, Seasonal variations, Spaceborne photography, Synthetic aperture radar, Backscattering, Surface roughness, Models, Photointerpretation, Correlation, Arctic Ocean

51-5332

Microwave snowpack studies made in the Austrian Alps during the SIR-C/X-SAR experiment.

Mätzler, C., Strozzi, T., Weise, T., Floricioiu, D.M., Rott, H., *International journal of remote sensing,* Aug. 1997, 18(12), p.2505-2530, 22 refs.

Alpine landscapes, Snow surveys, Sensor mapping, Spaceborne photography, Synthetic aperture radar, Snow cover distribution, Snow cover structure, Snow water content, Wet snow, Backscattering, Brightness, Austria—Alps

51-5333

Simulation of a multi-layer model of dense scatterers for anomalous scattering signatures from SSM/I snow data.

Jin, Y.Q., *International journal of remote sensing,* Aug. 1997, 18(12), p.2531-2538, 7 refs.

Snow surveys, Remote sensing, Spaceborne photography, Radiometry, Scattering, Brightness, Polarization (waves), Spectra, Grain size, Thermal radiation, Snow density, Mathematical models

51-5334

History of the Puula Lake complex, central Finland, and shifts in its outlet.

Tikkanen, M., *Fennia,* 1995, 173(1), p.1-32, Refs. p.30-32.

Limnology, Pleistocene, River basins, Geomorphology, Channels (waterways), Lacustrine deposits, Shoreline modification, Terraces, Stratigraphy, Palynology, Radioactive age determination, Finland

51-5335

Glacial landforms of the Peloponnisos (Greece).

Mastronuzzi, G., Sansò, P., Stamatopoulos, L., *Rivista geografica Italiana,* Mar. 1994, 101(1), p.77-86, With Italian and French summaries. 11 refs.

Pleistocene, Glacial geology, Tectonics, Landforms, Geomorphology, Moraines, Cirques, Snow line, Greece

51-5336

Vegetation/permafrost relationships in the Italian Alps. [Rapporti tra vegetazione e permafrost discontinuo in ambiente alpino: Val Vallaccia (Livigno—Sondrio)]

Cannone, N., Guglielmin, M., Smiraglia, C., *Rivista geografica Italiana,* Mar. 1995, 102(1), p.91-111, In Italian with English and French summaries. 23 refs.

Alpine landscapes, Discontinuous permafrost, Rock glaciers, Vegetation patterns, Permafrost indicators, Mapping, Sounding, Correlation, Italy—Alps

51-5337

Marmolada Glacier: geomorphological aspects of the central front. [Il ghiacciaio della Marmolada: aspetti geomorfologici della fronte centrale]

Mattana, U., *Rivista geografica Italiana,* Mar. 1995, 102(1), p.113-127, In Italian with English and French summaries. 22 refs.

Mountain glaciers, Alpine glaciation, Geomorphology, Glacier surveys, Glacier tongues, Glacial erosion, Periglacial processes, Italy—Marmolada Glacier

51-5338

Choanoflagellates (Acanthoecidae, Choanoflagellida) from the Weddell Sea, Antarctica, taxonomy and community structure with particular emphasis on the ice biota; with preliminary remarks on choanoflagellates from Arctic sea ice (Northeast Water Polynya, Greenland).

Thomsen, H.A., Garrison, D.L., Kosman, C., *Archiv für Protistenkunde,* June 1997, 148(1-2), p.77-114, 39 refs.

Sea ice, Ecology, Microbiology, Plankton, —South Atlantic Ocean

Ice biota studies in the Weddell Sea have focused on an examination of single cells and an analysis of community structure of the flagellate assemblage from sea ice and comparisons with planktonic assemblages. Based on extensive light microscopical analysis of 30 samples ranging from open water to "brown-ice" habitats, it became evident that the mature choanoflagellate community from ice is significantly different from both the water column community and those encountered in samples derived from newly formed ice. The choanoflagellates from sea ice encompasses a range of previously undescribed loricate taxa (*Acanthocorbis nana* n.sp., *A. weddellensis* n.sp., *A. prolongata* n.sp., *Apheloecion antarctica* n.sp., *A. glacialis* n.sp., *A. conicoides* n.sp., *Calliacantha frigida* n.sp., *C. ankyra* n.sp., *Diaphanoeca multiannulata* n. subsp. *glacialis. Parvicorbicula corynocostata* n.sp., and *P. pachycostata* n.sp.). These taxa have been investigated using a combination of light, and electron microscopy. (Auth. mod.)

51-5339

Volcanic gas emissions from Mount Erebus and their impact on the antarctic environment.

Zreda-Gostynska, G., Kyle, P.R., Finigan, D., Prestbo, K.M., *Journal of geophysical research,* July 10, 1997, 102(B7), p.15,039-15,055, 67 refs.

Volcanoes, Gases, Atmospheric composition, Air pollution, Aerosols, Antarctica—Erebus, Mount

Gas emission rates from the active volcano Mount Erebus increased between 1986 and 1991: SO_2 from 7.7 to 25.9 Gg/yr, HCl from 6.9 to 13.3 Gg/yr and HF from 4.0 to 6.0 Gg/yr. The emission rates of halogens from Mount Erebus are high relative to SO_2 emissions and are accompanied by relatively high emissions of trace gases and aerosols. Many elements found in the Erebus plume are common impurities in antarctic snow. Using a model which assumes a homogeneous distribution of the volcanic gas plume over Antarctica, Erebus could be a source of the impurities, by potentially contributing between 4 and 14 ng/g snow of Cl at the South Pole, and between 11 and 36 ng/g snow of Cl at Dome C. Similarly, predicted concentrations of Erebus-derived Cu, Zn, Cd, V, As, and Au in antarctic snow are close to those reported. Trace element and Pb isotope compositions of Erebus aerosols are similar to those collected in remote regions of Antarctica. The volcanic gas plume emitted from Erebus appears to make a significant contribution to the antarctic atmosphere and can be detected in the snow deposited over a wide area of the continent. (Auth. mod.)

51-5340

Tidal forcing of basal seismicity of ice stream C, West Antarctica, observed far inland.

Anadakrishnan, S., Alley, R.B., *Journal of geophysical research,* July 10, 1997, 102(B7), p.15,183-15,196, 51 refs.

Glacier flow, Tides, Ice models, Seismic surveys, Antarctica—Ross Ice Shelf

The seismicity rate beneath the downglacier 85 km of ice stream C, West Antarctica, is modulated by the tide. The tide beneath the Ross Ice Shelf modifies the force balance of the ice stream basal environment enough to change the rate of basal microearthquake generation by an order of magnitude. This tidal forcing travels up the ice stream as an attenuating wave at approximately 1.6 m/s and is detectable 85 km from the grounding line. The authors successfully model this behavior as an elastic ice stream underlain by a viscous substrate of viscosity η and thickness h_b and calculate that the substrate has an apparent stiffness η/h_b of $O(10^8)$ Pa s/m. This finding suggests that the conditions of the till layer at the bed of ice stream C are similar to those of ice stream B and that the reason for the recent stagnation of ice stream C is other than loss of till. It is further found that the ice stream at the grounding line is more strongly affected by ice shelf processes than by the basal shear stress. (Auth.)

51-5341

Some free boundary problems in theoretical glaciology.

Rodrigues, J.F., Santos, L., NATO Advanced Study Institute on the Mathematics of Models for Climatology and Environment, Puerto de la Cruz, Tenerife, Spain, Jan. 11-21, 1995. Proceedings. Edited by J.I. Díaz and NATO ASI, Series I. Global Environmental Change. Vol.48, Berlin, Springer-Verlag, 1997, p.337-364, 22 refs.

DLC QC981.M427

Glaciology, Ice mechanics, Glacier flow, Velocity, Ice solid interface, Phase transformations, Stefan problem, Boundary value problems, Mathematical models, Theories

51-5342

Structure, water budget, and radiational features of a high-latitude warm front.

Hanesiak, J.M., Stewart, R.E., Szeto, K.K., Hudak, D.R., Leighton, H.G., *Journal of the atmospheric sciences,* June 15, 1997, 54(12), p.1553-1573, 34 refs.

Fronts (meteorology), Precipitation (meteorology), Synoptic meteorology, Subpolar regions, Snowfall, Ice crystals, Classifications, Ice sublimation, Hydrologic cycle, Wind factors, Mathematical models

51-5343

Characterization of ice crystals in clouds by simple mathematical expressions based on successive modification of simple shapes.

Wang, P.K., *Journal of the atmospheric sciences,* Aug. 1, 1997, 54(15), p.2035-2041, 21 refs.

Clouds (meteorology), Cloud physics, Ice physics, Ice crystal structure, Ice crystal size, Dendritic ice, Mathematical models, Simulation

51-5344

Outline of the Quaternary of the Saguenay at its entry. [Aperçu de Quaternaire à l'embouchure du Saguenay, Québec]

Dionne, J.C., Occhietti, S., *Géographie physique et Quaternaire,* 1996, 50(1), p.5-34, In French with English and German summaries. Refs. p.32-34.

Pleistocene, Estuaries, Deltas, Sea level, Sedimentation, Stratigraphy, Glacial deposits, Quaternary deposits, Glacial geology, Isostasy, Geochronology, Glacier oscillation, Canada—Quebec—Saguenay

51-5345

Dendroglaciological dating of a Little Ice Age glacial advance at Moving Glacier, Vancouver Island, British Columbia.

Smith, D.J., Laroque, C.P., *Géographie physique et Quaternaire,* 1996, 50(1), p.47-55, With French and German summaries. 36 refs.

Glacier oscillation, Quaternary deposits, Glacier surveys, Moraines, Glacial deposits, Age determination, Geochronology, Canada—British Columbia—Vancouver Island

51-5346

Early postglacial sedimentation of lower Seymour Valley, southwestern British Columbia.

Lian, O.B., Hickin, E.J., *Géographie physique et Quaternaire,* 1996, 50(1), p.95-102, With French summary. 16 refs.

Glacial geology, Quaternary deposits, Glacial deposits, Valleys, Glacial erosion, Sedimentation, Geomorphology, Stratigraphy, Organic soils, Geochronology, Radioactive age determination, Canada—British Columbia—Seymour Valley

51-5347

Paleoclimatic implications of non-sorted polygons, Gironde Estuary, France. [Présence d'un réseau de grands polygones au sud de l'estuaire de la Gironde (France): interprétation et implications paléoclimatiques]

Texier, J.P., *Géographie physique et Quaternaire,* 1996, 50(1), p.103-108, In French with English summary. 44 refs.

Paleoclimatology, Geomorphology, Estuaries, Soil structure, Patterned ground, Polygonal topography, Periglacial processes, Permafrost distribution, Permafrost indicators, Thermal stresses, Photointerpretation, France—Gironde Estuary

51-5348

Intertidal rock platform erosion, upper St. Lawrence estuary. [Rainures de marques de choc oblongues sur la plate-forme intertidale à Cap-Sainté, haut estuaire du Saint-Laurent, Québec]

Dionne, J.C., *Géographie physique et Quaternaire,* 1996, 50(1), p.109-115, In French with English summary. 25 refs.

Littoral zone, Estuaries, Rock properties, Surface structure, Striations, Classifications, Ice erosion, Abrasion, Fast ice, Ice solid interface, Lithology, Canada—Saint Lawrence River

51-5349

Foraminiferal biofacies analysis of the Yakataga Formation, Icy Bay, Alaska: insights into Pliocene glaciomarine paleoenvironments of the Gulf of Alaska.

Zellers, S.D., *Palaios,* June 1990, 5(3), p.273-296, Refs. p.287-290.

Marine geology, Glacial geology, Pleistocene, Sedimentation, Rock properties, Stratigraphy, Plankton, Paleoecology, Classifications, Statistical analysis, United States—Alaska—Icy Bay

51-5350

Molecular volcano: abrupt CCl_4 desorption driven by the crystallization of amorphous solid water.

Smith, R.S., Huang, C., Wong, E.K.L., Day, B.D., *Physical review letters,* Aug. 4, 1997, 79(5), p.909-912, 26 refs.

Amorphous ice, Ice physics, Ice crystal growth, Water films, Ice spectroscopy, Doped ice, Ice sublimation, Ice water interface, Diffusion

51-5351

Sensitivity of a global ice-ocean model to the Bering Strait throughflow.

Goosse, H., Campin, J.M., Fichefet, T., Deleersnijder, E., *Climate dynamics,* June 1997, 13(5), p.349-358, 37 refs.

Climatology, Oceanography, Atmospheric boundary layer, Ocean currents, Fluid dynamics, Water transport, Salinity, Sea ice distribution, Ice edge, Ice water interface, Ice heat flux, Ice cover effect, Mathematical models, Bering Strait

51-5352

Circumstellar and interstellar synthesis of organic molecules.

Tielens, A.G.G.M., Charnley, S.B., *Origins of life and evolution of the biosphere,* June 1997, 27(1-3), p.23-51, Refs. p.48-51.

Cosmic dust, Extraterrestrial ice, Hydrocarbons, Ice composition, Geochemistry, Molecular structure, Gamma irradiation, Photochemical reactions

51-5353

Nature and evolution of interstellar ices.

Chiar, J.E., *Origins of life and evolution of the biosphere,* June 1997, 27(1-3), p.79-100, Refs. p.98-100.

Extraterrestrial ice, Cosmic dust, Molecular structure, Origin, Geochemistry, Infrared spectroscopy, Radiation absorption, Ice detection, Models, Theories

51-5354

Interstellar ices studied with the Infrared Space Observatory.

Whittet, D.C.B., *Origins of life and evolution of the biosphere,* June 1997, 27(1-3), p.101-113, 40 refs.

Extraterrestrial ice, Ice detection, Spacecraft, Ice spectroscopy, Infrared spectroscopy, Spectra, Classifications, Cosmic dust, Organic nuclei, Geochemistry

51-5355

Statistical verification of forecast icing risk indices.

Carriére, J.M., Alquier, S., Le Bot, C., Moulin, E., *Meteorological applications,* June 1997, 4(2), p.115-130, 10 refs.

Aircraft icing, Weather forecasting, Ice forecasting, Meteorological data, Statistical analysis, Indexes (ratios), Freezing indexes, Accuracy, Models

51-5356

Variation of winter road surface temperature due to topography and application of Thermal Mapping.

Shao, J., Swanson, J.C., Patterson, R., Lister, P.J., McDonald, A.N., *Meteorological applications,* June 1997, 4(2), p.131-137, 13 refs.

Road icing, Ice forecasting, Surface temperature, Temperature variations, Topographic effects, Sensor mapping, Temperature measurement, Infrared equipment, Correlation, Data processing

51-5357

Use of kites to investigate boundary layer meteorology.

Varley, M.J., *Meteorological applications,* June 1997, 4(2), p.151-159, 16 refs.

Climatology, Air temperature, Polar atmospheres, Atmospheric boundary layer, Ice shelves, Temperature inversions, Profiles, Radio echo soundings, Airborne equipment, Performance

The application of kites as a platform for meteorological measurement within the boundary layer is examined. Kites are shown to fulfil a useful role within this research area, particularly when a highly mobile, lightweight and inexpensive instrumental platform is required. They are ideal for use at remote sites, or sites where terrain limits access for more conventional profiling equipment. Appropriate kite selection for given wind conditions and experimental requirements is suggested. Experimental results from three diverse remote sites illustrate practical applications of the profiling system, including an investigation of the structure of surface inversions over an ice shelf in Antarctica. (Auth. mod.)

51-5358

Biomarker evidence for "Heinrich" events.

Rosell-Melé, A., Maslin, M.A., Maxwell, J.R., Schaeffer, P., *Geochimica et cosmochimica acta,* Apr. 1997, 61(8), p.1671-1678, 46 refs.

Sea ice, Icebergs, Water temperature, Ocean currents, Sediments, Hydrocarbons, Bacteria, North Atlantic Ocean

51-5359

Surface impedance time domain reflectometry for the determination of ice depth.

Garner, S.J., Thiel, D.V., O'Keefe, S.G., *Geophysical research letters,* July 1, 1997, 24(13), p.1599-1602, 16 refs.

Hydrogeology, Ice sheets, Ice cover thickness, Sounding, Radio waves, Reflectivity, Electrical resistivity, Mathematical models, Stratification

51-5360

Modern atmospheric background dust load: recognition in central Asian snowpack, and compositional constraints.

Hinkley, T., Pertsiger, F., Zav'ialova, L., *Geophysical research letters,* July 1, 1997, 24(13), p.1607-1610, 16 refs.

Climatology, Atmospheric composition, Dust, Aerosols, Sedimentation, Glacier ice, Snow composition, Chemical composition, Sampling, Ice cores, Origin, Kyrghyzstan

Dusts in strata of snowpack in the Alai-Pamir range, Kirghizstan, Central Asia, have chemical compositions that are in the same restricted range as those of the dusts found in snowpacks at three other locations: central south Greenland, the St. Elias (Alaska), and coastal Antarctica, where special-type local dust sources certainly cannot dominate. This similarity at the four widely separated sites appears to indicate that there is a modern atmospheric background dust that is the same on a regional, hemispheric, or global scale. The present study partially determines the chemical composition of the background dust, and confirms its existence in snowpack at four localities worldwide, including the center of the earth's largest continent where dusts of local source have considerable influence. (Auth. mod.)

51-5361

Noctilucent clouds: one- and two-color lidar observations.

von Cossart, G., Fiedler, J., von Zahn, U., Hansen, G., Hoppe, U.P., *Geophysical research letters,* July 1, 1997, 24(13), p.1635-1638, 20 refs.

Cloud physics, Cloud cover, Ice crystal optics, Remote sensing, Lidar, Backscattering, Particles, Stratification, Particle size distribution

51-5362

4-day wave as observed from the *Upper Atmosphere Research Satellite* Microwave Limb Sounder.

Allen, D.R., Stanford, J.L., Elson, L.S., Fishbein, E.F., Froidevaux, L., Waters, J.W., *Journal of the atmospheric sciences,* Feb. 1, 1997, 54(3), p.420-434, 40 refs.

Climatology, Polar atmospheres, Air temperature, Atmospheric pressure, Gravity waves, Fluid dynamics, Periodic variations, Sounding, Stratosphere, Ozone

The "4-day wave" is an eastward moving quasi-nondispersive feature with period near 4 days occurring near the winter polar stratopause over Antarctica. This paper presents evidence of the 4-day feature in Microwave Limb Sounder (MLS) temperature, geopotential height, and ozone data from the late southern winters of 1992 and 1993. Space-time spectral analyses reveal a double-peaked tempera-

ture structure consisting of one peak near the stratopause and another in the lower mesosphere, with an out-of-phase relationship between the two peaks. This double-peaked structure is reminiscent of recent three-dimensional barotropic/baroclinic instability model predictions and is observed here for the first time. (Auth. mod.)

51-5363

Effect of snow removal on leaf water potential, soil moisture, leaf and soil nutrient status and leaf peroxidase activity of sugar maple.

Pilon, C.E., Côté, B., Fyles, J.W., *Plant and soil,* May 1994, 162(1), p.81-88, Refs. p.87-88.

Plant physiology, Nutrient cycle, Trees (plants), Plant tissues, Snow cover effect, Frost action, Soil freezing, Simulation, Chemical analysis

51-5364

Nodulation and nitrogen fixation in extreme environments.

Bordeleau, L.M., Prévost, D., *Plant and soil,* Apr. 1994, 161(1), p.115-125, Refs. p.123-125.

Plant ecology, Plant physiology, Ecosystems, Roots, Soil microbiology, Cold tolerance, Growth, Temperature effects

51-5365

Chronology and paleoclimate of storm-induced erosion and episodic dune growth across Cape Espenberg Spit, Alaska, U.S.A.

Mason, O.K., Hopkins, D.M., Plug, L., *Journal of coastal research,* 1997, 13(3), p.770-797, Refs. p.793-797.

Beaches, Geomorphology, Arctic landscapes, Shore erosion, Sediment transport, Water waves, Storms, Landscape development, Paleoclimatology, Geochronology, Radioactive age determination, United States—Alaska—Cape Espenberg Spit

51-5366

Regional variation of winter temperatures in the Arctic.

Overland, J.E., Adams, J.M., Bond, N.A., *Journal of climate,* May 1997, 10(5), p.821-837, 35 refs.

Climatology, Polar atmospheres, Atmospheric boundary layer, Air temperature, Surface temperature, Surface energy, Temperature distribution, Seasonal variations, Atmospheric circulation, Gravity waves, Heat flux

51-5367

Precipitation over Greenland retrieved by a dynamic method and its relation to cyclonic activity.

Chen, Q.S., Bromwich, D.H., Bai, L.S., *Journal of climate,* May 1997, 10(5), p.839-870, 40 refs.

Climatology, Synoptic meteorology, Precipitation (meteorology), Fronts (meteorology), Glacier mass balance, Glacial meteorology, Atmospheric circulation, Ice air interface, Ice cover effect, Analysis (mathematics), Topographic effects, Greenland

51-5368

Greenland and antarctic mass balances for present and doubled atmospheric CO_2 from the GENESIS Version-2 global climate model.

Thompson, S.L., Pollard, D., *Journal of climate,* May 1997, 10(5), p.871-900, Refs. p.898-900.

Climatology, Global warming, Carbon dioxide, Snow accumulation, Glacier mass balance, Glacier melting, Runoff, Regelation, Sea level, Mathematical models, Forecasting, Greenland

There are two significant problems in using general circulation models (GCMs) to predict mass balance distributions on ice sheets: the relatively coarse GCM horizontal resolution truncates the topography of the ice-sheet flanks and smaller ice sheets such as Greenland; and the snow and ice physics in most GCMs does not include ice-sheet-specific processes such as the refreezing of meltwater. This GCM is well suited for ice-sheet mass-balance studies because (a) the surface can be represented at a finer resolution than the atmospheric GCM, (b) the two correction techniques are included as part of the model, and (c) the model's mass balances for present-day Greenland and Antarctica are realistic. (Auth. mod.)

51-5369

Application of a polythermal three-dimensional ice sheet model to the Greenland ice sheet: response to a steady-state and transient climate scenarios.

Greve, R., *Journal of climate,* May 1997, 10(5), p.901-918, 40 refs.

Climatology, Climatic changes, Air temperature, Ice sheets, Ice temperature, Bottom ice, Glacier melting, Ice volume, Greenhouse effect, Global warming, Mathematical models, Ice models, Greenland

51-5370

Response of a global coupled ocean-atmosphere-sea ice climate model to an imposed North Atlantic high-latitude freshening.

Cai, W.J., Syktus, J., Gordon, H.B., O'Farrell, S., *Journal of climate,* May 1997, 10(5), p.929-948, Refs. p. 947-948.

Climatology, Oceanography, Ocean currents, Buoyancy, Salinity, Climatic changes, Surface temperature, Air ice water interaction, Sea ice distribution, Ice cover thickness, Models, Heat flux, Atlantic Ocean

51-5371

Dansgaard-Oeschger Oscillations in a coupled atmosphere-ocean climate model.

Sakai, K., Peltier, W.R., *Journal of climate,* May 1997, 10(5), p.949-970, 34 refs.

Paleoclimatology, Oceanography, Climatic changes, Glacier oscillation, Ocean currents, Salinity, Heat flux, Ice cover effect, Ice models, Ice cores, Oxygen isotopes, Mathematical models

51-5372

Cloud radiative properties over the South Pole from AVHRR infrared data.

Lubin, D., Harper, D.A., *Journal of climate,* Dec. 1996, 9(12)pt.III, p.3405-3418, 26 refs.

Climatology, Surface temperature, Polar stratospheric clouds, Radiometry, Cloud cover, Optical properties, Radiance, Brightness, Ice crystal size, Statistical analysis, Antarctica—South Pole

Over the antarctic plateau, the radiances measured by the AVHRR middle infrared channels are shown to depend on effective cloud temperature, emissivity, ice water path, and effective radius of the particle size distribution. AVHRR imagery can be used to characterize cloud optical properties over the antarctic continent if surface weather observations and/or radiosonde data can be collocated with the satellite overpasses. From AVHRR imagery covering the South Pole during 1992, the mean cloud emissivity is estimated at 0.43 during summer and 0.37 during winter. When a radiative transfer model is used to evaluate these results in comparison with surface pyrgeometer measurements, the comparison suggests that the AVHRR retrieval method captures the overall behavior in cloud properties. During months when the polar vortex persists, AVHRR infrared radiances may be noticeably influenced by polar stratospheric clouds. (Auth. mod.)

51-5373

Ice bilayer on Pt(111): nucleation, structure and melting.

Morgenstern, M., Müller, J., Michely, T., Comsa, G., *Zeitschrift für Physikalische Chemie,* 1997, 198(pt.1-II), p.43-72, With German summary. 32 refs.

Ice physics, Ice solid interface, Adsorption, Ice microstructure, Scanning electron microscopy, Molecular structure, Solid phases, Phase transformations, Heterogeneous nucleation, Electrical resistivity

51-5374

1994-1995 seismicity and deformation at the Hengill triple junction, Iceland: triggering of earthquakes by minor magma injection in a zone of horizontal shear stress.

Sigmundsson, F., Einarsson, P., Rögnvaldsson, S.T., Foulger, G.R., Hodgkinson, K.M., Thorbergsson, G., *Journal of geophysical research,* July 10, 1997, 102(B7), p.15,151-15,161, Refs. p.15,160-15,161.

Seismology, Subpolar regions, Tectonics, Volcanoes, Shear stress, Earthquakes, Magma, Geologic processes, Geodetic surveys, Iceland

51-5375

Proceedings.

International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997, Iskandar, I.K., ed, Wright, E.A., ed, Radke, J.K., ed, Sharratt, B.S., ed, Groenevelt, P.H., ed, Hinzman, L.D., ed, SR 97-10, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, 573p., ADA-326 007, Refs. passim. For individual papers see 51-5376 through 51-5467.

Soil freezing, Ground thawing, Frozen ground thermodynamics, Frozen ground chemistry, Soil chemistry, Soil composition, Soil conservation, Soil water migration, Soil microbiology, Snowmelt

51-5376

Physics, chemistry, and ecology of frozen soils in managed ecosystems: an introduction.

Sharratt, B.S., Radke, J.K., Hinzman, L.D., Iskandar, I.K., Groenevelt, P.H., MP 4073, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.1-7, 45 refs.

Soil freezing, Ground thawing, Frozen ground strength, Frozen ground thermodynamics, Frozen ground chemistry, Soil air interface, Soil conservation, Soil microbiology, Ecology, Environmental protection, Regional planning

Some of the world's most productive soils lie within cold regions. To enhance the productivity and quality of soil resources within these regions, knowledge must be advanced concerning the impact of freezing and thawing on soil properties and processes. The International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils is a step toward broadening the knowledge of frozen soil processes. This paper emphasizes the physical nature of frozen soil and the importance of freezing and thawing to the transport of water and heat at the Earth's surface. The authors also discuss the chemistry and biology of the soil system as affected by freezing and thawing. Ascertaining changes in ecosystem structure and productivity in response to perturbations in climate or management depends primarily on the use of models; these models require the acquisition of new knowledge to better define linkages among the physical, chemical, and biological components in cold regions. New knowledge concerning the dynamics of the frozen soil system will allow global societies and industries to develop sustainable and environmentally-safe management systems.

51-5377

Seasonally frozen layer: geotechnical significance and needed research.

Williams, P.J., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.9-15, 30 refs.

Active layer, Soil structure, Microstructure, Soil freezing, Soil water migration, Frost heave, Frozen ground strength, Frozen ground thermodynamics

51-5378

Freezing and thawing effects on soil water and solute movement in repacked soil columns.

Radke, J.K., Berry, E.C., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.17-23, 13 refs.

Soil freezing, Ground thawing, Freezing front, Soil water migration, Ice lenses, Frozen ground thermodynamics, Frozen ground chemistry

51-5379

Water infiltration and movement in seasonally frozen soils.

Stähli, M., Jansson, P.E., Lundin, L.C., Flühler, H., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.24-30, 17 refs.

Snow hydrology, Snowmelt, Seepage, Frozen ground thermodynamics, Soil water migration, Runoff forecasting

51-5380
Mechanics of meltwater movement above and within frozen soil.
Baker, J.M., Spaans, E.J.A., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.31-36, 3 refs.
Snow hydrology, Snowmelt, Seepage, Frozen ground thermodynamics, Soil water migration, Runoff forecasting

51-5381
Some details of the ice lens formation mechanism at the bottom of a seasonally freezing layer in a permafrost zone.
Grechishchev, S.E., Grechishcheva, O.V., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.37-41, 4 refs.
Embankments, Active layer, Permafrost preservation, Soil freezing, Soil water migration, Ice lenses, Frozen ground thermodynamics, Frozen ground strength, Thaw weakening

51-5382
Elevation and latitude impacts on soil temperature and duration and distribution of frost and snowfall in Colorado.
Davis, J.G., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.42-48, 3 refs.
Meteorological data, Air temperature, Snowfall, Snow cover distribution, Snow cover effect, Soil temperature, Frost penetration, Frost forecasting, Statistical analysis, United States—Colorado

51-5383
Investigation of water-rock interactions in the Apsat River basin.
Baldanova, D.D., Radnaeva, D.B., Borzenko, S.V., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.49-53, 7 refs.
Permafrost weathering, Suprapermafrost ground water, Frozen rocks, Weathering, Hydrogeochemistry, Frozen ground chemistry, Lithology, Mineralogy, Russia—Transbaikal

51-5384
Heat and water regimes of soil for the winter-spring period: experiment and modeling.
Gusev, E.M., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.55-61, 11 refs.
Soil freezing, Frost penetration, Soil water migration, Soil temperature, Snow heat flux, Snow hydrology, Snowmelt, Snow cover effect, Seepage, Ground thawing, Runoff forecasting, Mathematical models

51-5385
Erosion and crop response to contour-ripped planted-wheat in seasonally frozen soil of the Pacific Northwest.
Williams, J.D., Wilkins, D.E., Schillinger, W.F., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.62-65, 9 refs.
Frozen ground strength, Soil erosion, Soil conservation, Soil stabilization, Slope protection, Agriculture, United States—Washington

51-5386
Model COLD: validation and application for modeling annual dynamics of soil water.
Gusev, E.M., Nasonova, O.N., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.66-72, 14 refs.
Soil freezing, Frost penetration, Ground thawing, Soil temperature, Snow cover effect, Snow heat flux, Snow hydrology, Snowmelt, Seepage, Runoff forecasting, Computerized simulation, Mathematical models

51-5387
Model for the dynamics of characteristics of spatial variability of soil freezing depth.
Gusev, E.M., Busarova, O.E., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.73-79, 10 refs.
Soil freezing, Frost penetration, Frost forecasting, Soil water migration, Snow cover effect, Snow heat flux, Snow hydrology, Snowmelt, Seepage, Mathematical models

51-5388
Influence of water and heat dynamics on solifluction movements in a periglacial environment in the eastern Alps (Austria).
Jaesche, P., Veit, H., Stingl, H., Huwe, B., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.80-86, 20 refs.
Periglacial processes, Soil freezing, Frost heave, Frozen ground thermodynamics, Unfrozen water content, Ground thawing, Solifluction, Austria

51-5389
Crystallization heat of soil water.
Starostin, E.G., Timofeev, A.M., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.87-90, 9 refs.
Soil freezing, Frozen ground thermodynamics, Soil water, Unfrozen water content, Hygroscopic water, Enthalpy, Freezing points, Phase transformations, Ice formation

51-5390
Optimization of soil mineralogical composition for predicting soil thermal conductivity.
Tarnawski, V.R., Wagner, B., Webber, J., Pettipas, L., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.91-97, 15 refs.
Soil structure, Soil composition, Mineralogy, Soil water migration, Thermal conductivity, Computerized simulation

51-5391
Modeling the magnitude and time dependence of nonconductive heat-transfer effects in taiga and tundra soils.
Outcalt, S.I., Hinkel, K.M., Miller, L.L., Nelson, F.E., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.98-104, 15 refs.
Taiga, Forest soils, Tundra soils, Soil freezing, Ground thawing, Active layer, Frozen ground thermodynamics, Frozen ground temperature, Soil temperature, Heat transfer, Computerized simulation

51-5392
Soil temperature and seasonal thaw: controls and interactions in floodplain stands along the Tanana River, interior Alaska.
Adams, P.C., Viereck, L.A., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.105-111, 10 refs.
Floodplains, Forest strips, Plant ecology, Vegetation patterns, Revegetation, Vegetation factors, Snow cover effect, Permafrost beneath rivers, Soil temperature, Ground thawing, Thaw depth, United States—Alaska—Tanana River, United States—Alaska—Fairbanks

51-5393
Frozen soil effects on depression focused water and solute movement.
Derby, N.E., Knighton, R.E., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.113-119, 8 refs.
Snow composition, Snow impurities, Snowmelt, Seepage, Soil pollution, Ground water, Water pollution, Frozen ground chemistry, Ground thawing, Drainage

51-5394
Land-slide induced changes in the chemical composition of active-layer soils and surface-water runoff, Yamal Peninsula, Russia.
Leibman, M.O., Streletskaia, I.D., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.120-126, 7 refs.
Permafrost weathering, Permafrost mass transfer, Active layer, Saline soils, Frozen ground chemistry, Ground ice, Ground thawing, Periglacial processes, Slope processes, Landslides, Runoff, Russia—Yamal Peninsula

51-5395
Solute movement in the active layer, Taymyr, Siberia.
Boike, J., Van Loon, W.K.P., Overduin, P.P., Hubberten, H.W., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.127-132, 18 refs.
Saline soils, Active layer, Frozen ground thermodynamics, Frozen ground chemistry, Unfrozen water content, Electromagnetic prospecting, Russia—Taymyr Peninsula

51-5396
Effect of pore solution concentration and composition upon the electric and elastic properties of frozen saline soils.
Chervinskaia, O.P., Zykov, IU.D., Frolov, A.D., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.133-139, 10 refs.
Saline soils, Permafrost structure, Frozen ground chemistry, Frozen ground strength, Soil creep, Electromagnetic prospecting

51-5397

Modeling equations for two-dimensional coupled heat, fluid and solute transport in variably-saturated, variably-frozen soils.

Nieber, J.L., Friedel, M.J., Sharratt, B.S., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.140-146, 25 refs.

Soil freezing, Freezing front, Soil water migration, Frozen ground thermodynamics, Frozen ground chemistry, Mathematical models

51-5398

Movement of water and ions in frozen clay by electroosmosis.

Mizoguchi, M., Ito, T., Matsukawa, K., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.147-152, 6 refs.

Clay soils, Soil pollution, Soil freezing, Artificial freezing, Frozen ground chemistry, Soil water migration, Electroosmosis, Land reclamation, Waste disposal, Mathematical models

51-5399

Soil electrical properties modified by freezing.

McIntosh, G.C., Sharratt, B.S., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.153-159, 10 refs.

Soil freezing, Freezing front, Frost penetration, Electrical resistivity

51-5400

Tillage induced air permeability modified by soil freezing.

Sharratt, B.S., Huggins, D., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.161-164, 7 refs.

Soil freezing, Ground thawing, Soil structure, Freeze thaw tests, Soil strength, Soil air interface, Permeability, Soil conservation, Soil stabilization

51-5401

Aggregate stability response to freeze-thaw cycles.

Lehrsch, G.A., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.165-171, 24 refs.

Soil freezing, Ground thawing, Soil tests, Freeze thaw tests, Soil aggregates, Soil strength, Soil stabilization, Soil conservation

51-5402

Overwinter changes in aggregate size distribution of a loam in west central Minnesota.

Lindstrom, M.J., Sharratt, B.S., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.172-176, 11 refs.

Loams, Soil aggregates, Soil freezing, Ground thawing, Frost weathering, Soil structure, Soil erosion, Wind erosion, Soil conservation, United States—Minnesota

51-5403

Effect of freezing cycles on water stability of soil aggregates.

Dagesse, D.F., Groenevelt, P.H., Kay, B.D., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.177-181, 16 refs.

Soil aggregates, Soil structure, Soil freezing, Ground thawing, Freeze thaw tests, Soil chemistry, Soil strength

51-5404

Amelioration of soil compaction by freezing and thawing.

Sharratt, B.S., Voorhees, W.B., McIntosh, G.C., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.182-188, 15 refs.

Soil erosion, Soil structure, Soil freezing, Ground thawing, Land reclamation, Soil conservation

51-5405

Freeze-thaw effects on the hydrologic characteristics of rutted and compacted soils.

Gatto, L.W., MP 4074, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.189-198, 36 refs.

Soil strength, Soil erosion, Water erosion, Gullies, Seepage, Soil freezing, Ground thawing, Frost action, Freeze thaw tests

U.S. Army training exercises compact and often rut soils, which can increase hillslope runoff and concentrate surface flows, and enhance soil erosion. The objectives are to determine the effects of freeze-thaw (FT) on vehicular ruts, which concentrate flows and often erode to gullies. A noncohesive silt was rutted with a pickup truck, then frozen and thawed three times. Frost heave, rut geometry, soil compression, shear strength, and infiltration were measured. Results show that 1) ruts start to freeze later and thaw slower than uncompacted soil; 2) once ruts start to freeze, they freeze faster than unrutted soil; 3) the ruts heave an average of 0.2 to 3.2 mm more than unrutted soil; 4) the infiltration in ruts increases by 62%, unconfined compression strength decreases by 16% and shear strength by 14%, and rut hydraulic radius decreases an average of 9% after three FT cycles. These results suggest that the volume of water flowing in these ruts would be lower, the rut soils would be weaker (more erodible) and the rut flow velocity would be lower after the FT cycles. Future experiments will investigate rut and rill responses in different soils at variable FT rates.

51-5406

Spatial variability of frost depth in a depressional catchment.

Brooks, E.S., Nieber, J.L., Wilson, B.N., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.199-205, 8 refs.

Soil freezing, Frost penetration, Frost forecasting, Ground thawing, Snow depth, Snow cover effect, Soil temperature, Topographic effects, Statistical analysis

51-5407

Crop and soil management to increase water infiltration into frozen soil.

Pikul, J.L., Jr., Aase, J.K., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.206-211, 16 refs.

Snow retention, Snowmelt, Seepage, Soil water migration, Soil freezing, Frozen ground thermodynamics, Soil erosion, Soil conservation

51-5408

Freezing and colloid aggregation.

Blank, R.R., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.212-217, 14 refs.

Mountain soils, Meadow soils, Soil colloids, Soil aggregates, Soil formation, Soil freezing, Frost weathering, Frozen ground chemistry, Lithology, Mineralogy

51-5409

Impact of freezing and thawing on the stability of casts produced by earthworms.

Berry, E.C., Swalla, A.A., Jordan, D., Radke, J.K., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.218-223, 22 refs.

Soil aggregates, Soil structure, Soil composition, Soil strength, Frost action, Frost resistance, Freeze thaw tests

51-5410

Spatial variability of frozen soil runoff at different scales.

Seyfried, M.S., Flerchinger, G.N., Murdock, M.D., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.224-230, 23 refs.

Snow hydrology, Snow depth, Snowmelt, Snow cover effect, Seepage, Frozen ground thermodynamics, Soil erosion, Stream flow, Runoff forecasting, Flood forecasting

51-5411

Erosion impacts of the soil-thawing process.

Froese, J., Cruse, R.M., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.231-234, 7 refs.

Frozen ground thermodynamics, Ground thawing, Soil strength, Thaw weakening, Soil erosion, Water erosion

51-5412

Surface cover effects on soil loss from temporally frozen cropland in the Pacific Northwest.

McCool, D.K., Saxton, K.E., Williams, J.D., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.235-241, 7 refs.

Frost action, Ground thawing, Soil strength, Soil erosion, Water erosion, Soil conservation, Vegetation factors, Snowmelt, Runoff forecasting, Computerized simulation, United States—Washington

51-5413

Cool-period soil erosion due to rilling in Prince Edward Island, Canada.

Richter, G., Edwards, L., Schmidt, R.G., Bernsdorf, B., Burney, J., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.242-246, 18 refs.

Snowmelt, Snow cover effect, Frost action, Soil erosion, Agriculture, Vegetation factors, Soil erosion, Water erosion, Gullies, Soil conservation, Canada—Prince Edward Island

51-5414

Differential frost heave in seasonally frozen soils.

Fowler, A.C., Noon, C.G., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.247-252, 18 refs.

Soil freezing, Freezing front, Frost penetration, Frost heave, Frozen ground thermodynamics, Snow cover effect, Patterned ground, Mathematical models

51-5415

Thirty-five years of measuring frost depths in Wisconsin soils.

Peterson, A.E., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.253-260, 5 refs.

Soil surveys, Soil freezing, Snow depth, Snow cover effect, Frost forecasting, Frost penetration, Statistical analysis, United States—Wisconsin

51-5416

Soil moisture dynamics in areas of discontinuous permafrost.

Hinzman, L.D., Lilly, E.K., Kane, D.L., Johnson, R.A., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.261-267, 21 refs.

Discontinuous permafrost, Permafrost hydrology, Snowmelt, Seepage, Soil water, Ground water, Water balance, United States—Alaska—Fort Wainwright

51-5417

Borehole electrometry for monitoring the active layer dynamics.

Boĭkov, S.A., Snegirev, A.M., Frolov, A.D., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.268-274, 4 refs.

Reservoirs, Permafrost beneath rivers, Permafrost surveys, Permafrost thermal properties, Active layer, Frozen ground thermodynamics, Frozen ground temperature, Ground thawing, Thaw depth, Borehole instruments, Electromagnetic prospecting, Russia—Vilyuy River

51-5418

Some features of mechanical property changes during snow densification.

Frolov, A.D., Golubev, V.N., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.275-279, 7 refs.

Snow strength, Snow elasticity, Snow compression, Snow density, Snow cover structure, Metamorphism (snow)

51-5419

Ablation of shallow seasonal snowcovers.

Shook, K., Gray, D.M., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.280-286, 10 refs.

Snow hydrology, Snow heat flux, Snow melting, Snow evaporation, Snow cover distribution, Snow water equivalent, Snow air interface, Albedo, Computerized simulation

51-5420

Estimating snowmelt infiltration into medium and fine-textured frozen soils.

Zhao, L.T., Gray, D.M., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.287-293, 10 refs.

Snow hydrology, Snow cover effect, Snowmelt, Seepage, Frozen ground thermodynamics, Soil water migration, Ground water, Runoff forecasting, Mathematical models

51-5421

Effect of fire on temperature, moisture, and CO_2 emissions from soils near Tok, Alaska: an initial assessment.

O'Neill, K.P., Kasischke, E.S., Richter, D.D., Krasovic, V., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.295-303, 28 refs.

Taiga, Forest soils, Forest fires, Soil chemistry, Soil composition, Soil microbiology, Soil air interface, Nutrient cycle, Carbon dioxide, Atmospheric composition, Global warming

51-5422

Early winter CH_4 and CO_2 emissions from alpine grassland soils at Qingshuihe, Qinghai-Tibet Plateau.

Jin, H.J., Cheng, G.D., Lin, Q., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.304-307, 9 refs.

Steppes, Meadow soils, Mountain soils, Tundra soils, Permafrost, Frozen ground chemistry, Soil chemistry, Soil composition, Soil air interface, Atmospheric composition, Nutrient cycle, Geochemical cycles, China—Qinghai-Xizang Plateau

51-5423

Additional methane emission from thawing cryosols: Yamal Peninsula, Russia.

Rivkin, F.M., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.308-314, 7 refs.

Permafrost surveys, Permafrost dating, Permafrost forecasting, Ground thawing, Frozen ground chemistry, Soil composition, Soil chemistry, Soil air interface, Atmospheric composition, Nutrient cycle, Geochemical cycles, Global warming, Russia—Yamal Peninsula

51-5424

Soil and plant N dynamics of annual barley in interior Alaska.

Cochran, V.L., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.315-319, 17 refs.

Grasses, Agriculture, Plant ecology, Plant physiology, Soil chemistry, Soil microbiology, Nutrient cycle, United States—Alaska

51-5425

Effects of past fertilizer treatments on the fate of newly added fertilizer nitrogen applied to cereal crops in Siberia.

Barsukov, P.A., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.320-326, 32 refs.

Grasses, Agriculture, Plant ecology, Plant physiology, Taiga, Forest soils, Soil chemistry, Nutrient cycle, Russia—Siberia

51-5426

Effect of freezing on soil moisture and nutrient distribution at Levinson-Lessing Lake, Taymyr Peninsula, Siberia.

Overduin, P.P., Young, K.L., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.327-333, 22 refs.

Soil freezing, Freezing front, Soil water migration, Active layer, Permafrost mass transfer, Permafrost hydrology, Frozen ground chemistry, Hydrogeochemistry, Nutrient cycle, Russia—Taymyr Peninsula

51-5427

Effects of freezing and thawing on N_2O production in soil under different agricultural practices.

Prévost, D., Van Bochove, E., Pelletier, F., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.334-337, 7 refs.

Soil freezing, Freeze thaw cycles, Frost action, Frozen ground chemistry, Soil chemistry, Soil microbiology, Nutrient cycle, Soil air interface, Agriculture, Soil conservation

51-5428

Effect of permafrost on dissolved organic carbon exports from two subarctic streams.

MacLean, R., Irons, J.G., III, Oswood, M.W., McDowell, W.H., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.338-344, 25 refs.

Watersheds, Streams, Permafrost hydrology, Frozen ground chemistry, Hydrogeochemistry, Water chemistry, Nutrient cycle, Biomass, United States—Alaska—Fairbanks

51-5429

Influence of fertilization on phosphorus status of seasonally frozen arable Siberian soils.

Makarikova, R.P., Barsukov, P.A., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.345-348, 12 refs.

Soil surveys, Soil classification, Organic soils, Chernozem, Soil chemistry, Soil composition, Frost action, Nutrient cycle, Soil conservation, Agriculture, Russia—Siberia

51-5430

Physical chemistry of geochemical solutions at subzero temperatures.

Marion, G.M., Grant, S.A., MP 4075, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.349-356, 25 refs.

Saline soils, Soil freezing, Frozen ground thermodynamics, Frozen ground chemistry, Soil chemistry, Soil structure, Porosity, Capillarity, Permafrost thermal properties, Permafrost hydrology, Soil microbiology, Cryobiology, Computerized simulation, Mathematical models

Theoretical developments, specifically the Pitzer equations and thermoporometry, coupled with improved experimental data on the thermophysical properties of supercooled solutions indicate that quantitative estimates are possible for the thermophysical properties of aqueous electrolyte solutions in frozen porous media. The Pitzer equations are statements of a solution's excess Gibbs energy. When fully parameterized, the Pitzer equations allow the calculation of activity coefficients, osmotic coefficients, enthalpies, entropies, Gibbs energies, heat capacities, and molal volumes of highly concentrated aqueous electrolyte solutions to temperatures below -50°C. While developed to calculate capillary pressures for pure pore liquids, the theoretical development that yielded thermoporometry can be extended directly to pore solutions composed of complex electrolyte solutions, by which freezing behavior of chemically realistic natural soils can be calculated. Application of the FREZCHEM model to an arctic permafrost soil demonstrated that significant amounts of water may remain liquid in saline soils as the result of salt exclusion from ice during the freezing process and the formation of brine pockets. These simulations also demonstrated that environmental conditions are marginally suitable for microbial activity in frozen soils under extreme conditions. Frozen soils have the potential to serve as a refugium for life.

51-5431

Physicochemical factors affecting soil acidity in seasonally frozen soils.

Bondarenko, N.F., Gurikov, IU,V., Savel'eva, E.M., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.357-360, 10 refs.

Soil freezing, Frozen ground thermodynamics, Frozen ground chemistry, Frost action, Soil chemistry

51-5432

Ground freezing for containment of hazardous waste: engineering aspects.

Iskandar, I.K., Sayles, F.H., MP 4076, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.361-369, 12 refs.

Soil freezing, Artificial freezing, Soil pollution, Soil stabilization, Soil conservation, Waste disposal, Environmental protection

The use of frozen soils has been proposed as an alternative method to contain hazardous waste. This technology has recently been advanced and adopted for application, and several demonstration projects are proposed. This paper describes engineering aspects of artificial soil freezing for containment of hazardous waste, geological conditions, environmental issues, advantages and limitations, performance monitoring and research needs.

51-5433

Effects of freezing and organic matter transformation on soil physical status.

Balashov, E.V., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.370-374, 11 refs.

Organic soils, Soil freezing, Frost action, Frozen ground thermodynamics, Frozen ground chemistry, Soil chemistry, Soil structure, Soil microbiology

51-5434

Characterization of the organic matter in subarctic and arctic tundra soils in north Siberia.

Gundelwein, A., Pfeiffer, E.M., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.375-379, 19 refs.

Soil surveys, Soil classification, Permafrost structure, Permafrost hydrology, Tundra soils, Frozen ground chemistry, Soil chemistry, Soil composition, Soil microbiology, Russia—Siberia

51-5435

Humus formation in forest frozen soils in the Baikal region.

Klenov, B.M., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.380-383, 6 refs.

Forest soils, Organic soils, Frozen ground chemistry, Soil chemistry, Soil formation, Soil composition, Russia—Baykal, Lake

51-5436

Exchangeable cations and composition of organic matter in soils as affected by acidification and freezing.

Polubesova, T.A., Shirshova, L.T., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.384-390, 28 refs.

Organic soils, Soil freezing, Frost action, Soil chemistry, Frozen ground chemistry, Soil composition

51-5437

Optimization of crop nutrition on podzolic soils of the European northwest.

El'kina, G.IA., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.391-395, 4 refs.

Organic soils, Forest soils, Podsol, Soil chemistry, Soil composition, Soil conservation, Liming, Agriculture, Russia—Komi

51-5438

Nitrogen cycle in the taiga zone of the Republic of Komi.

Beznosikov, V.A., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.396-402, 11 refs.

Organic soils, Forest soils, Podsol, Soil chemistry, Soil composition, Nutrient cycle, Agriculture, Soil conservation, Russia—Komi

51-5439

Response of soil organic matter to change of air temperature in forest ecosystems.

Vedrova, E.F., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.403-407, 10 refs.

Organic soils, Forest soils, Forest ecosystems, Soil chemistry, Soil composition, Decomposition, Nutrient cycle, Soil air interface, Air temperature, Russia—Krasnoyarsk

51-5440

Use of frozen-ground barriers for containment and in-situ remediation of heavy-metal contaminated soil.

Boitnott, G.E., Iskandar, I.K., Grant, S.A., MP 4077, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.409-416, 11 refs.

Soil pollution, Soil freezing, Artificial freezing, Permafrost preservation, Frozen ground chemistry, Waste disposal, Land reclamation

Barriers formed from artificially frozen ground have been proposed for isolating heavy-metal contaminated soils. In this bench-top study, the authors examined the effectiveness of a frozen-ground barrier in containing heavy-metal-laden liquid generated during soil remediation. A soil, artificially contaminated with Cd, Cu, Ni, and Zn, was placed above a frozen water-saturated uncontaminated soil layer. The temperature of the frozen layer was maintained at -3°C. The contaminated soil was flushed with a 0.1 M EDTA solution. Over 90% of the Cu and Zn and over 80% of the Cd and Ni were recovered from the unfrozen layer. Most of the remaining metals were found in a narrow zone of soil at the boundary between the frozen and unfrozen layers, while smaller amounts appear to have migrated into the barrier, apparently by diffusion in liquid-water films. The experiments demonstrated that the frozen-soil barrier prevented the migration of most of the metal-EDTA complexes, even at only -3°C. While the mechanism for the movement of small amounts of metals into this layer remains unclear, the authors suspect cooling below -3°C would improve the barrier's performance.

51-5441

Peatlands in the discontinuous permafrost zone along the Norman Wells pipeline, Canada.

Burgess, M.M., Tarnocai, C., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.417-424, 20 refs.

Underground pipelines, Permafrost beneath structures, Permafrost preservation, Wetlands, Peat, Environmental impact, Frozen ground settling, Revegetation, Soil erosion, Soil conservation, Canada—Northwest Territories—Norman Wells

51-5442

Peculiarities of distribution of technogenic hydrocarbons through the vertical profile of peat and tundra gley soils of forest-tundra landscapes in western Siberia, polluted as a result of oil-gas condensate extraction.

Sadov, A.P., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.425-429, 15 refs.

Oil spills, Forest tundra, Forest soils, Tundra soils, Peat, Soil pollution, Soil chemistry, Russia—Tyumen

51-5443

Predicting diauxy during bioremediation in organic soil.

White, D.M., Luong, H., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.430-435, 10 refs.

Tundra soils, Organic soils, Oil spills, Soil pollution, Soil microbiology, Soil chemistry, Waste disposal, Land reclamation

51-5444

Investigation of an abandoned diesel storage cavity in permafrost.

Spaans, E.J.A., Baker, J.M., Iskandar, I.K., Koenen, B.A., Pidgeon, C.S., MP 4078, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.436-442, 4 refs.

Fuels, Waste disposal, Oil spills, Soil pollution, Permafrost preservation, Permafrost thermal properties, Permafrost hydrology, Frozen ground chemistry, Soil chemistry, Land reclamation

In 1974 an experiment was conducted to test the feasibility of storing diesel fuel in an unlined cavity created in permafrost. A test cavity was excavated, and at the conclusion of the experiment the diesel was not removed, but sawdust was added to adsorb the diesel, and the shaft leading from the cavity to the surface was backfilled with gravel. In 1994, diesel fuel was observed on the soil surface in the vicinity of the shaft. The entire gravel shaft was contaminated with diesel; the soil outside the shaft exhibited much lower levels of contamination. A video camera lowered into the cavity showed massive ice on all cavity walls. The authors tentatively conclude that during the years 1975-1994 water entered the gravel shaft, migrated downward to the cavity, and displaced the diesel fuel which moved upward through the shaft. The permafrost cavity failed to provide an environmentally sound enclosure for the diesel.

51-5445

Soil organic matter of spodic horizons in soils of coastal continental Antarctica and Germany.

Beyer, L., Knicker, H., Blume, H.P., Bölter, M., Schneider, D., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.443-448, 33 refs.

Organic soils, Podsol, Soil surveys, Soil classification, Soil profiles, Soil formation, Soil composition, Soil chemistry, Soil microbiology, Nutrient cycle, Antarctica, Germany

The soil organic matter (SOM) of relic ornithogenic soils in coastal continental Antarctica, which showed morphological features like a Podzol, was compared to spodic horizons in Germany. The authors' goal was to unravel the little knowledge of organic matter of ornithogenic soils by means of wet-chemistry and nuclear magnetic resonance spectroscopy (NMR). In contrast to the German soils the SOM of the antarctic soils was characterized by a high percentage of amino derivatives from proteins, polysaccharides, urates and chitin, resulting in a mean C-to-N ratio of 10. The high content of carboxyl carbon units probably derived from amino and other organic acids. The pattern of the ^{15}N-NMR spectra of the penguin guano suggested the presence of uric acid. Concerning the podzolization process the data suggested the migration of organic acids, not-humified carbohydrates an N-containing moieties, from the topsoil into the spodic horizons of the ornithogenic soils. In the SOM of Podzols formed under temperate climate conditions N-compounds, and non-humified carbohydrates were of minor importance within the SOM translocation processes. (Auth.)

51-5446

Distribution of oil and oil products in soils of tundra landscapes within the European territory of Russia (ETR).

Solntseva, N.P., Guseva, O.A., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.449-453, 10 refs.

Forest tundra, Tundra soils, Organic soils, Podsol, Peat, Soil profiles, Oil spills, Soil pollution, Frozen ground chemistry, Soil chemistry, Russia—Bol'shezemel'skaya Tundra

51-5447

Some properties of seasonally frozen soils of northeastern Europe.

Rusanova, G.V., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.455-458, 11 refs.

Taiga, Forest tundra, Forest soils, Tundra soils, Podsol, Soil surveys, Soil classification, Soil formation, Soil profiles, Soil composition, Soil chemistry, Russia—Komi

51-5448

Humus composition and transformation in a pergelic terric cryohemist of coastal continental Antarctica.

Beyer, L., Blume, H.P., Sorge, C., Schulten, H.R., Erlenkeuser, H., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.459-464, 29 refs.

Organic soils, Peat, Mosses, Soil surveys, Soil classification, Soil formation, Soil profiles, Frozen ground chemistry, Soil chemistry, Soil composition, Antarctica—Casey Station

Organic matter of an antarctic peat soil was studied with special emphasis on soil formation processes. An integrated approach, including wet-chemical analyses, cross-polarization magic angle spinning carbon-13 nuclear magnetic resonance spectroscopy (CP/MAS ^{13}C-NMR), and pyrolysis-field ionization mass spectrometry (Py-FIMS), was applied to characterize the soil organic matter (SOM) composition at different depths. Dead moss was the fresh organic matter. Aliphat-C units dominate in the SOM. Alkyl compounds consist of lipids, fatty acids and sterols. The aromatic structures identified by CP/MAS ^{13}C-NMR and by Py-FIMS demonstrate that lignin input is not necessary for the formation of aromatic humic structures. Within the humification process, carbohydrates are less mineralized in Antarctica than under temperate climate conditions and these moieties also dominate in the SOM of deeper horizons. The extremely cold climate conditions of Antarctica retard the transformation of fresh organic residues. Nevertheless, alkyl carbon units are incorporated into the complex humic matter and enriched due to a selective preservation. (Auth.)

51-5449

Temperature regime of gley-podzolic soils of the European northeast (Komi Republic).

Zaboeva, I.V., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.465-467, 1 ref.

Taiga, Forest soils, Tundra soils, Organic soils, Podsol, Soil surveys, Soil classification, Soil chemistry, Soil composition, Frozen ground temperature, Agriculture, Russia—Komi

51-5450

Ecology of long-term seasonally frozen soils of the taiga in Siberia.

Gorbachev, V.N., Babintseva, R.M., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.469-472, 12 refs.

Taiga, Forest soils, Permafrost weathering, Frost weathering, Frozen ground chemistry, Soil formation, Soil classification, Soil chemistry, Soil composition, Russia—Siberia

51-5451

Impacts of tracked vehicles on properties of tundra soils.

Buchkina, N.P., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.473-476, 6 refs.

Tundra soils, Tracked vehicles, Environmental impact, Soil erosion, Soil profiles, Soil composition, Soil chemistry, Frozen ground chemistry, Russia—Yamal Peninsula

51-5452

Nature restoration strategy in the Far North.

Archegova, I.B., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.477-480, 5 refs.

Economic development, Environmental impact, Soil erosion, Permafrost preservation, Soil conservation, Revegetation, Land reclamation, Russia—Komi

51-5453

Bacterial biomass and properties of arctic desert soils (Archipelago Severnaya Zemlya, northern Siberia).

Bölter, M., Pfeiffer, E.M., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.481-487, 22 refs.

Desert soils, Tundra soils, Tundra vegetation, Vegetation patterns, Plant ecology, Permafrost hydrology, Frozen ground chemistry, Soil chemistry, Soil composition, Soil microbiology, Cryobiology, Bacteria, Russia—Severnaya Zemlya

51-5454

Effects of soil freezing and thawing on the bacterial population in the wheat rhizosphere.

Hashimoto, T., Nitta, T., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.488-492, 11 refs.

Frost action, Agriculture, Grasses, Plant ecology, Roots, Soil chemistry, Soil microbiology, Cryobiology, Bacteria, Japan—Hokkaido

51-5455

Overwintering of insect pathogens.

Lewis, L.C., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.493-498, 26 refs.

Plant ecology, Acclimatization, Cold tolerance, Cryobiology, Fungi, Microbiology, Physiological effects

51-5456

Impact of freezing and thawing of soils on microbiology and pesticide degradation potential.

Schulze-Aurich, J., Lehmann, M., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.499-506, 10 refs.

Soil freezing, Artificial freezing, Cold storage, Frost resistance, Soil stabilization, Frozen ground chemistry, Soil chemistry, Soil microbiology, Soil tests, Freeze thaw tests

51-5457

Snowmelt saturation restricts Scots pine growth on fine-grained tills in Lapland.

Sutinen, R., Hänninen, P., Mäkitalo, K., Penttinen, S., Sutinen, M.L., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.507-512, 4 refs.

Snow hydrology, Snowmelt, Snow cover effect, Seepage, Glacial till, Trees (plants), Vegetation patterns, Growth, Plant ecology, Plant physiology, Electromagnetic prospecting, Finland

51-5458

Seasonal changes in soil temperature and in the frost hardiness of Scots pine roots under subarctic conditions.

Sutinen, M.L., Ritari, A., Holappa, T., Kujala, K., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.513-517, 17 refs.

Soil temperature, Frozen ground temperature, Trees (plants), Roots, Plant ecology, Plant physiology, Acclimatization, Cold tolerance, Frost resistance, Finland

51-5459

Thermal properties of seasonally frozen soils, and modeling soil freezing or thawing.

Kurtener, D.A., Romanov, P.G., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.519-524, 27 refs.

Soil freezing, Permafrost thermal properties, Frozen ground thermodynamics, Artificial freezing, Frost penetration, Frost forecasting, Computerized simulation, Mathematical models

51-5460

Extreme-value statistics for maximum soil frost penetration in the northeastern U.S. using air temperature and snow cover data.

DeGaetano, A.T., Wilks, D.S., McKay, M., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.525-530, 8 refs.

Soil freezing, Frost penetration, Frost forecasting, Air temperature, Soil air interface, Snowfall, Snow cover distribution, Snow cover effect, Meteorological data, Records (extremes), Statistical analysis, United States

51-5461

Comparison of three models for predicting frost in soils.

Kennedy, I., Sharratt, B.S., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.531-536, 10 refs.

Soil freezing, Frost penetration, Frost forecasting, Computerized simulation

51-5462

Modeling soil freezing and thawing, and frozen soil runoff with the SHAW model.

Flerchinger, G.N., Seyfried, M.S., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.537-543, 7 refs.

Soil freezing, Ground thawing, Frost penetration, Thaw depth, Frozen ground thermodynamics, Soil water migration, Unfrozen water content, Snow hydrology, Snowmelt, Runoff forecasting, Flood forecasting, Computerized simulation

51-5463

Passive microwave detection and modeling of frozen soils in tundra and grassland areas.

Kim, E.J., Liou, Y.A., England, A.W., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.545-550, 22 refs.

Tundra soils, Soil temperature, Frozen ground temperature, Permafrost distribution, Snow cover distribution, Terrain identification, Radiometry, Spaceborne photography

51-5464

Monitoring the effects of fire on soil temperature and moisture in boreal forest ecosystems using satellite imagery.

French, N.H.F., Kasischke, E.S., Michalek, J.L., Bourgeau-Chavez, L.L., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.551-557, 11 refs.

Taiga, Forest ecosystems, Forest fires, Forest soils, Soil temperature, Soil water, Soil air interface, Geochemical cycles, Synthetic aperture radar, Radiometry, Spaceborne photography

51-5465

Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors.

Kestler, M.A., Bull, D., Wright, B., Hanek, G., Truebe, M., MP 4079, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.558-564, 5 refs.

Pavements, Frost heave, Frost penetration, Frost forecasting, Soil water, Unfrozen water content, Moisture meters, Moisture detection, Electromagnetic prospecting, Road maintenance

Time domain reflectometry (TDR) is gaining rapid acceptance in the United States as a nonradioactive technique for measuring volumetric moisture content, and TDR sensors are increasingly being used to determine the effect that fluctuations in moisture content have on pavement systems. Although not as common, radio frequency (RF) sensors can also be used to monitor changes in moisture content in pavement systems. To evaluate the accuracy and repeatability of both TDR and RF moisture sensors installed in pavements experiencing seasonal freezing, the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) and the U.S. Department of Agriculture Forest Service (USFS) have developed a simple, inexpensive laboratory freeze-thaw moisture sensor testing device. The following paper discusses the test apparatus design and construction, test procedure, and observations resulting from a series of freeze-thaw tests using a sandy-silt.

51-5466

Examining the use of time domain reflectometry in frozen soils.

Spaans, E.J.A., Baker, J.M., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.565-569, 6 refs.

Frozen ground thermodynamics, Soil water, Unfrozen water content, Moisture detection, Moisture meters, Electromagnetic prospecting

51-5467

Physics, chemistry, and ecology of seasonally frozen soils: a wrap-up discussion.

Radke, J.K., Sharratt, B.S., Hinzman, L.D., Groenevelt, P.H., Iskandar, I.K., MP 4080, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.571-573.

Soil freezing, Frozen ground thermodynamics, Soil microbiology, Soil conservation, Research projects

Seasonally frozen soils occur over a large portion of the Northern Hemisphere and include some of the most productive and also the most fragile soils in the world. Research reported from 12 countries at the International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils covered a wide range of topics and represented many disciplines. While the knowledge of frozen soils is vast, much remains to be learned. Future frozen soils research needs include: 1) measurement techniques, 2) changes in soil microstructure, 3) adaptation of soil organisms, 4) new simulation models and management tools, 5) interdisciplinary research, and 6) applied research for managing ecosystems. The big task for the future is to integrate knowledge gained through frozen soils research into useful tools for the development of new management systems for the global ecosystems.

51-5468

Frost penetration in soil with an inclusion of sand: dependence on soil moisture content and winter severity.

Peck, L., O'Neill, K., MP 4081, *Canadian geotechnical journal,* June 1997, 34(3), p.368-383, With French summary. 15 refs.

Frozen ground mechanics, Phase transformations, Soil freezing, Freezing front, Frost penetration, Soil temperature, Sands, Water content, Admixtures, Thermal conductivity, Heat transfer, Mathematical models, Computerized simulation

An innovative numerical method was developed for calculating multidimensional heat conduction with phase change. The method can easily be included in standard finite element and finite difference heat transfer programs. Simulations of one- and two-dimensional heat transfer in soil with an inclusion of sand were done to investigate the disruption in frost and thaw penetration due to the presence of a dry, low thermal conductivity sand. The dependence of frost depth on weather conditions was investigated by using four different (coldest, cold, warm, warmest) winter-long temperature histories for the soil surface boundary condition. With details depending on the moisture content of the soil, significant effects on the time history of frost penetration were observed when a wide sand inclusion is present. Frost penetration actually proceeds more rapidly through the sand at first because it is dry and, therefore, has a lower latent heat and heat capacity; initial frost depth is greater when a sand inclusion is present. Freezing of the soil below the sand inclusion is subsequently impeded by the slow removal of heat at the base of the sand as a consequence of its lower thermal conductivity; thus, the maximum frost depth is greater in soil without a sand inclusion.

51-5469

Comparison of uniaxial and borehole jack tests at Fort Providence ice crossing, 1995.

Masterson, D.M., Graham, W.P., Jones, S.J., Childs, G.R., *Canadian geotechnical journal,* June 1997, 34(3), p.471-475, With French summary. 13 refs.

Ice crossings, Ice strength, Bearing strength, Mechanical tests, Ice deformation, Boreholes, Ice cores, Ice mechanics, Tensile properties

51-5470
Generation of action potential induces preadaptation of *Cucurbita pepo* L. stem tissues to freezing injury.
Retivin, V.G., Opritov, V.A., Fedulina, S.B., *Russian journal of plant physiology,* July-Aug. 1997, 44(4), p.432-442, Translated from Fizoiologiia rasteniĭ. 28 refs.
Plant physiology, Plant tissues, Cold stress, Cold tolerance, Frost resistance, Acclimatization, Electrical resistivity, Thermoelectric effects

51-5471
Effect of fusicoccin on the activity and carbohydrate specificity of lectins from crown cell walls and the frost resistance of winter wheat plants.
Komarova, E.N., Vol'nova, T.L., Trunova, T.I., Vyskrebentseva, E.I., *Russian journal of plant physiology,* July-Aug. 1997, 44(4), p.454-457, Translated from Fiziologiia rasteniĭ. 18 refs.
Plant physiology, Grasses, Plant tissues, Frost resistance, Cold tolerance, Chemical analysis, Chemical properties, Temperature effects

51-5472
Assimilation of inorganic nitrogen by antarctic and temperate marine phytoplankton species under UV stress.
Döhler, G., *Russian journal of plant physiology,* July-Aug. 1997, 44(4), p.518-525, Translated from Fiziologiia rasteniĭ. 30 refs.
Marine biology, Plankton, Ecosystems, Ultraviolet radiation, Solar radiation, Photosynthesis, Simulation, Light effects
Natural phytoplankton samples and sea-ice algae from the Weddell Sea were exposed to UV-A and UV-B under controlled laboratory conditions during two *Polarstern* cruises. Additionally, the influence of UV radiation on phytoplankton assemblages of the North Sea, German Bight, and of unialgal cultures of temperate marine diatoms were investigated. Pigment biosynthesis by natural phytoplankton and sea-ice algae was inhibited by UV-B and enhanced after UV-A radiation. Results were discussed with respect to the effect of UV radiation on the key enzymes of nitrogen metabolism as related to adaptation strategies of algae to environmental UV conditions. (Auth. mod.)

51-5473
Development of a Late Weichselian-Early Holocene subaqueous ice-contact fan, Teikangas, SW Finland.
Lunkka, J.P., Alhonen, P., *Geological Society of Finland. Bulletin,* 1996, 68(pt.1), p.34-49, Refs. p.48-49.
Glacial geology, Paleoecology, Geomorphology, Deltas, Subglacial drainage, Outwash, Meltwater, Sedimentation, Stratigraphy, Ice edge, Finland—Teikangas

51-5474
Acidification of till in northern Finland: experimental study.
Aario, R., Peuraniemi, V., *Geological Society of Finland. Bulletin,* 1996, 68(pt.1), p.50-60, 22 refs.
Glacial geology, Subarctic landscapes, Glacial deposits, Hydrogeochemistry, Geological surveys, Soil chemistry, Leaching, Soil tests, Solubility, Finland

51-5475
Early Weichselian biostratigraphy and vegetational development at Horonkylä, Pohjanmaa, western Finland.
Grönlund, T., Ikonen, L., *Geological Society of Finland. Bulletin,* 1996, 68(pt.1), p.61-84, Refs. p.81-82.
Pleistocene, Quaternary deposits, Glacial geology, Subarctic landscapes, Moraines, Stratigraphy, Palynology, Algae, Classifications, Vegetation patterns, Finland

51-5476
Evidence for the former existence of a thicker ice sheet on the Vestfjella nunataks in western Dronning Maud Land, Antarctica.
Lintinen, P., *Geological Society of Finland. Bulletin,* 1996, 68(pt.1), p.85-98, Refs. p.97-98.
Pleistocene, Glacial geology, Glacial erosion, Rock properties, Striations, Glacier flow, Nunataks, Lithology, Antarctica—Kraul Mountains
A 130 km long nunatak range in western Queen Maud Land, the Kraul Mountains, whose northern and southern ends are situated close to the present ice sheet grounding-line were studied. Striations and lodgement till on nunatak Basen indicate that the northernmost nunataks were formerly covered by a thicker antarctic ice sheet. Striations on the summit ridge of nunatak Plogen indicate that the minimum change in ice thickness has been 700 m at the present ice sheet grounding-line. The relatively uniform oldest striation direction on different nunatak summits and the altitude of Plogen, which is less than 200 m lower than the highest summits, indicates that the whole range may have been covered by an ice sheet. Age determinations and sedimentological data obtained from Weddell Sea sediments by Norwegian researchers suggest that a grounded ice sheet extended to the shelf edge at around 21 ka B.P. (Auth. mod.)

51-5477
Arctic Nuclear Waste Assessment Program.
Edson, R., Johnson, G.L., Codispoti, L.A., Curtin, T., ANWAP Science Team, *Oceanography,* 1997, 10(1), p.4-10, 23 refs.
Oceanography, Estuaries, Water pollution, Radioactive wastes, Waste disposal, Environmental impact, Environmental tests, Research projects, Environmental protection, Safety, Arctic Ocean

51-5478
Microbe-plant competition, allelopathy and arctic plants.
Wardle, D.A., Nilsson, M.C., *Oecologia,* Jan. 1997, 109(2), p.291-293, 18 refs.
Ecosystems, Plant ecology, Soil microbiology, Plant tissues, Decomposition, Biomass, Growth, Nutrient cycle

51-5479
Variations of mean cold season temperature, precipitation and snow depths during the last 100 years in the former Soviet Union (FSU).
Fallot, J.M., Barry, R.G., Hoogstrate, D., *Hydrological sciences journal,* June 1997, 42(3), p.301-327, With French summary. 31 refs.
Climatology, Climatic changes, Meteorological data, Snow cover distribution, Snow depth, Air temperature, Precipitation (meteorology), Seasonal variations, Correlation, Statistical analysis, Russia

51-5480
North Atlantic's transformation pipeline chills and redistributes subtropical water.
McCartney, M.S., Curry, R.G., Bezdek, H.F., *Oceanus,* 1996, 39(2), p.19-23.
Oceanography, Climatology, Climatic changes, Subpolar regions, Water temperature, Ocean currents, Surface temperature, Cooling, Thermal diffusion, Turbulent diffusion, Atlantic Ocean

51-5481
Labrador Sea water carries northern climate signal south.
Curry, R.G., McCartney, M.S., *Oceanus,* 1996, 39(2), p.24-28.
Oceanography, Climatology, Subpolar regions, Ocean currents, Convection, Water temperature, Air water interactions, Profiles, Labrador Sea

51-5482
Climatology of significant winter-type weather events in the contiguous United States, 1982-94.
Branick, M.L., *Weather and forecasting,* June 1997, 12(2), p.193-207, 6 refs.
Climatology, Winter, Precipitation (meteorology), Snowfall, Ice storms, Distribution, Meteorological data, Weather observations, Synoptic meteorology, Periodic variations, Statistical analysis, Weather forecasting, United States

51-5483
Influence of terrain-induced circulations on wintertime temperature and snow level in the Washington Cascades.
Steenburgh, W.J., Mass, C.F., Ferguson, S.A., *Weather and forecasting,* June 1997, 12(2), p.208-227, 37 refs.
Climatology, Mountains, Synoptic meteorology, Atmospheric circulation, Air temperature, Profiles, Heating, Snow line, Wind factors, Topographic effects, Simulation, Weather forecasting, United States—Washington—Cascade Mountains

51-5484
Glaciers of Prince William Sound and the southern part of the Kenai Peninsula, Alaska. III. Glaciers of the west coast of Prince William Sound.
Grant, U.S., Higgins, D.F., *American Geographical Society. Bulletin,* 1911, 43(6), p.401-417, Footnotes passim.
Glacier surveys, Alpine glaciation, Glacier oscillation, Glacial geology, Marine geology, United States—Alaska—Prince William Sound

51-5485
Glaciers of Prince William Sound and the southern part of the Kenai Peninsula, Alaska. II. Glaciers of Port Wells, Prince William Sound.
Grant, U.S., Higgins, D.F., *American Geographical Society. Bulletin,* 1911, 43(5), p.321-338, Footnotes passim.
Glacier surveys, Alpine glaciation, Glacier oscillation, Glacial geology, Marine geology, United States—Alaska—Prince William Sound

51-5486
Glaciers of Prince William Sound and the southern part of the Kenai Peninsula, Alaska. IV. Glaciers of the southern coast of the Kenai Peninsula.
Grant, U.S., Higgins, D.F., *American Geographical Society. Bulletin,* 1911, 43(10), p.721-737, Footnotes passim.
Glacier surveys, Alpine glaciation, Glacier oscillation, Glacial geology, Marine geology, United States—Alaska—Kenai Peninsula

51-5487
Mackenzie Delta Borehole Project.
Dallimore, S.R., ed, Matthews, J.V., Jr., ed, *Canada. Environmental Studies Research Funds. Report,* Apr. 1997, No.135, n.p., CD-ROM only.
Geological surveys, Exploration, Boreholes, Permafrost surveys, Permafrost dating, Permafrost distribution, Permafrost thickness, Paleoclimatology, Stratigraphy, Well logging, Hydrates, Canada—Northwest Territories—Mackenzie Delta

51-5488
Effects of runway anti-icing chemicals on traction.
Marinelli, R., *U.S. Federal Aviation Administration. Technical Center. Technical note,* Nov. 1990, DOT/FAA/CT-TN90/53, 10p. + append., N91-15189, 3 refs.
Runways, Pavements, Road icing, Chemical ice prevention, Rubber ice friction, Traction, Skid resistance

51-5489
Design of flat concrete roofs in relation to thermal effects. *Building Research Station, Garston, Watford, Hertfordshire, England. Digest (first series),* Nov. 1949, No.12, 5p.
Buildings, Roofs, Concrete slabs, Thermal stresses, Thermal insulation

51-5490
Condensation problems in buildings. *Building Research Station, Garston, Watford, Hertfordshire, England. Digest (first series),* Reprinted 1967, No.23, 6p., Original date not given.
Buildings, Condensation, Vapor barriers, Thermal insulation, Ventilation

51-5491
Causes of dampness in buildings. *Building Research Station, Garston, Watford, Hertfordshire, England. Digest (first series),* Aug. 1951, No.33, 7p., Refs. passim.
Buildings, Moisture transfer, Condensation, Humidity

51-5492
Domestic heating—estimation of seasonal heat requirements and fuel consumption in houses. *Building Research Station, Garston, Watford, Hertfordshire, England. Digest,* Nov. 1956, No.94, 5p.
Houses, Heating, Heat sources, Heat loss, Fuels

51-5493
Repairing brickwork. *Building Research Station, Garston, Watford, Hertfordshire, England. Digest (second series),* Sep. 1960, No.4, 4p., 17 refs.
Buildings, Bricks, Masonry, Corrosion, Weatherproofing

51-5494

Thermal insulation of factory buildings.

Nash, G.D., *Building Research Station, Garston, Watford, Hertfordshire, England. Factory building studies,* 1962, No.11, 23p., 12 refs.

Industrial buildings, Roofs, Heat loss, Thermal insulation, Cold weather construction

51-5495

Technical aspects of thermal insulation in buildings.

Pratt, A.W., *Building Research Station, Garston, Watford, Hertfordshire, England. Building research current papers. Engineering series,* [1964], No.17, 9p. + figs., 15 refs. Presented at the Insulation Convention, London, Feb. 25-28, 1964.

Buildings, Walls, Thermal insulation, Cold weather construction

51-5496

Weather conditions and productivity—detailed study of five building sites.

Clapp, M.A., *Building Research Station, Garston, Watford, Hertfordshire, England. Building research current papers. Construction series,* [1966], No.32, p.171,172,175,176,179,180, 3 refs. Reprinted from Building, Vol.211, No.6439, Oct. 14, 1966.

Cold weather construction, Cold exposure, Human factors, Labor factors, United Kingdom—England

51-5497

Thermal and acoustic properties of lightweight concretes.

Loudon, A.G., Stacy, E.F., *Building Research Station, Garston, Watford, Hertfordshire, England. Building research current papers. Design series,* [1966], No.45, 11p. + figs., 15 refs. Reprinted from Structural concrete, Vol.3, Mar.-Apr. 1966, p.58-76.

Buildings, Concrete structures, Lightweight concretes, Thermal conductivity, Sound transmission

51-5498

Thermal conductivity of masonry materials.

Arnold, P.J., *Building Research Station, Garston, Watford, Hertfordshire, England. Current papers,* Jan. 1970, No.1, p.101-109, 35 refs. Reprinted from the Institution of Heating and Ventilating Engineers. Journal, Vol.37, Aug. 1969, p.101-108,117.

Concretes, Bricks, Thermal conductivity, Moisture

51-5499

Operational snow accumulation-ablation model for areal distribution of shallow ephemeral snowpacks.

Schroeter, H.O., Ontario, University of Guelph, 1988, 325p., Ph.D. thesis. Refs. p.248-255.

Snow hydrology, Snow water equivalent, Snow cover distribution, Snow accumulation, Snowmelt, Snow evaporation, Snow erosion, Runoff forecasting, Stream flow, Computerized simulation

51-5500

Erosion and uplift uncertainties in the Barents Sea, Norway.

Lerche, L., *Mathematical geology,* May 1997, 29(4), p.469-501, 29 refs.

Marine geology, Ocean bottom, Tectonics, Bottom sediment, Glacial erosion, Hydrocarbons, Isostasy, Lithology, Compaction, Mathematical models, Barents Sea

51-5501

Micromechanics of ice deformation and fracture.

Epifanov, V.P., *Mechanics of solids,* 1996, 31(4), p.93-108, Translated from Izvestiia RAN. Mekhanika tverdogo tela. 30 refs.

Ice mechanics, Mechanical tests, Dynamic loads, Ice deformation, Cracking (fracturing), Ice microstructure, Ice acoustics, Acoustic measurement, Plastic deformation, Rheology

51-5502

Role of critical phenomena in the heterogeneous crystallization of supercooled water.

IAtsimirskiĭ, V.K., Budarin, V.L., Oleksenko, L.P., Liapin, R., Frankovich, M., *Theoretical and experimental chemistry,* Nov. 1996, 32(3), p.167-171, Translated from Teoreticheskaia i ėksperimental'naia khimiia. 9 refs.

Ice physics, Phase transformations, Ice crystal growth, Water vapor, Ice water interface, Ice nuclei, Heterogeneous nucleation, Supercooling, Water temperature, Temperature effects

51-5503

On the ecosystems approach to the zoning of tundra forests.

Abaimov, A.P., Sofronov, M.A., *Russian journal of ecology,* July-Aug. 1997, 28(4), p.221-223, Translated from Ekologiia. 22 refs.

Forest ecosystems, Forest tundra, Tundra vegetation, Vegetation patterns, Classifications, Terminology, Environmental protection

51-5504

Chlorophyll fluorescence as a parameter for frost hardiness in winter wheat. A comparison with other hardiness parameters.

Clement, J.M.A.M., van Hasselt, P.R., *Phyton,* 1996, 36(1), p.29-41, Refs. p.38-41.

Plant ecology, Grasses, Cold stress, Frost resistance, Damage, Supercooling, Chlorophylls, Luminescence, Photochemical reactions, Electrical resistivity, Correlation, Temperature effects, Simulation

51-5505

Spatial modeling of snow water equivalent using covariances estimated from spatial and geomorphic attributes.

Carroll, S.S., Cressie, N., *Journal of hydrology,* Mar. 1, 1997, 190(1-2), p.42-59, 20 refs.

Snow hydrology, Snow water content, Water supply, Forecasting, River basins, Geomorphology, Altitude, Snow courses, Statistical analysis, Correlation, Mathematical models

51-5506

Stable oxygen isotope variations in rain, snow and streamwaters at the Schluchsee and Villingen sites in the Black Forest, SW Germany.

Neal, M., Neal, C., Brahmer, G., *Journal of hydrology,* Mar. 1, 1997, 190(1-2), p.102-110, 14 refs.

Watersheds, Snow hydrology, Stream flow, Ground water, Storms, Snowmelt, Runoff, Oxygen isotopes, Isotope analysis, Hydrogeochemistry, Seasonal variations, Germany—Black Forest

51-5507

Autumn frost damage: clonal variation in Sitka spruce.

Nicoll, B.C., Redfern, D.B., McKay, H.M., *Forest ecology and management,* Jan. 1996, 80(1-4), p.107-112, 19 refs.

Trees (plants), Forestry, Plant ecology, Frost resistance, Plant tissues, Damage, Acclimatization, Classifications

51-5508

Rising seas.

Schneider, D., *Scientific American,* Mar. 1997, 276(3), p.112-117.

Climatic changes, Global warming, Sea level, Ice sheets, Glacier melting, Meltwater, Flooding, Forecasting

Scientists began warning more than 20 years ago that global warming might cause a precariously placed store of frozen water in Antarctica to melt, leading to a calamitous rise in sea level—perhaps 5 or 6 m worth. Yet predicting exactly how—or whether—sea level will shift in response to global warming remains a significant challenge. Scientists trained in many separate disciplines are attempting to glean answers using a variety of experimental approaches, ranging from drilling into the antarctic ice cap to bouncing radar off the ocean from space. With such efforts, investigators have learned a great deal about how sea level has varied in the past and how it is currently changing. For example, most of these scientists agree that the ocean has been creeping upward by 2 mm a year for at least the past several decades. But determining whether a warmer climate will lead to a sudden acceleration in the rate of sea level rise remains an outstanding question. (Auth. mod.)

51-5509

Assimilation of Geosat altimeter data into a quasigeostrophic model of the Antarctic Circumpolar Current.

Seiß, G., Schröter, J., Guretskiĭ, V.V., *Monthly weather review,* July 1997, 125(7), p.1598-1614, 42 refs.

Oceanography, Sea level, Ocean currents, Height finding, Spacecraft, Mathematical models, Bottom topography, Statistical analysis

To study the relationship between mesoscale variability and the mean circulation of the Antarctic Circumpolar Current, the authors have assimilated Geosat altimeter measurements into a quasigeostrophic model of the southern ocean. The model is eddy resolving and includes realistic lateral boundaries and bottom topography. The method of "nudging" is applied for a continuous assimilation of the satellite data. When sea surface height is nudged into the model instead of vorticity, a fast convergence toward observations is found. However, when the technique that was proven successful in identical twin experiments is used with real data, it is observed that there is only slight improvement. The success of the assimilation is restricted mainly to driving the variability of the model closer to the observations. Additionally, in the ice-covered domain of the southern ocean, which is modeled but not constrained by Geosat observations, the authors find a major improvement. The overestimation of the westward current around Antarctica is reduced significantly. (Auth. mod.)

51-5510

Evaporation regimes and evaporation modelling in an alpine tundra environment.

Saunders, I.R., Bailey, W.G., Bowers, J.D., *Journal of hydrology,* Aug. 1997, 195(1-4), p.99-113, 32 refs.

Climatology, Alpine landscapes, Tundra terrain, Atmospheric boundary layer, Moisture transfer, Evaporation, Heat flux, Surface energy, Mathematical models

51-5511

Change in snowpack, soil water, and streamwater chemistry with elevation during 1990, Fraser Experimental Forest, Colorado.

Stottlemyer, R., Troendle, C.A., Markowitz, D., *Journal of hydrology,* Aug. 1997, 195(1-4), p.114-136, Refs. p.134-136.

Snow hydrology, Hydrogeochemistry, Alpine landscapes, Watersheds, Snowmelt, Meltwater, Ion diffusion, Ion density (concentration), Stream flow, Altitude, Correlation, Seasonal variations, United States—Colorado

51-5512

Effects of Pleistocene glaciations on the geohydrological system of northwest Europe.

Van Weert, F.H.A., Van Gijssel, K., Leijnse, A., Boulton, G.S., *Journal of hydrology,* Aug. 1997, 195(1-4), p.137-159, 19 refs.

Pleistocene, Paleoclimatology, Glacier melting, Hydrogeology, Subglacial drainage, Ground water, Water flow, Simulation, Waste disposal, Radioactive wastes, Environmental protection

51-5513

Modelling coupled transport of mass and energy into the snowpack—model development, validation and sensitivity analysis.

Tuteja, N.K., Cunnane, C., *Journal of hydrology,* Aug. 1997, 195(1-4), p.232-255, Refs. p.253-255.

Snow hydrology, Snowmelt, Mass balance, Heat balance, Meltwater, Capillarity, Seepage, Snow water equivalent, Mathematical models, Simulation, Runoff forecasting

51-5514

Measurement of water and solute dynamics in freezing soil columns with time domain reflectometry.

Stähli, M., Stadler, D., *Journal of hydrology,* Aug. 1997, 195(1-4), p.352-369, Refs. p.367-369.

Frozen ground mechanics, Soil freezing, Freeze thaw cycles, Geochemistry, Salinity, Water content, Water transport, Solubility, Thermal diffusion, Simulation, Temperature effects

51-5515

Linking space-time scale in hydrological modelling with respect to global climate change. Part 1. Models, model properties, and experimental design.

Panagoulia, D., Dimou, G., *Journal of hydrology,* July 1997, 194(1-4), p.15-37, Refs. p.35-37.

Watersheds, Ground water, Stream flow, Water storage, Climatic changes, Snow hydrology, Snow accumulation, Snowmelt, Water balance, Models, Runoff forecasting, Seasonal variations

51-5516

Linking space-time scale in hydrological modelling with respect to global climate change. Part 2. Hydrological response for alternative climates.

Panagoulia, D., Dimou, G., *Journal of hydrology,* July 1997, 194(1-4), p.38-63, 28 refs.

Snow hydrology, Watersheds, Water balance, Snowmelt, Ground water, Evapotranspiration, Runoff forecasting, Climatic changes, Seasonal variations, Simulation, Models

51-5517

Seasonal snowpack influence on the hydrology of a sub-arctic catchment in Scotland.

Soulsby, C., Helliwell, R.C., Ferrier, R.C., Jenkins, A., Harriman, R., *Journal of hydrology,* May 1997, 192(1-4), p.17-32, 33 refs.

Snow surveys, Snow hydrology, Watersheds, Hydrologic cycle, Hydrogeochemistry, Subarctic landscapes, Snow accumulation, Snowmelt, Runoff, Stream flow, Snow water equivalent, Snow cover effect, Seasonal variations, Sampling, United Kingdom—Scotland

51-5518

Holocene glacier advances in the Topolovaya Valley, Bystrinskiy Range, Kamchatka, Russia, dated by tephrochronology and lichenometry.

Savoskul, O.S., Zech, W., *Arctic and alpine research,* May 1997, 29(2), p.143-155, 50 refs.

Glacier oscillation, Glacial geology, Rock glaciers, Cirques, Moraines, Magma, Geochemistry, Geochronology, Lichens, Soil formation, Russia—Kamchatka

51-5519

Reconstruction of Holocene changes in alpine vegetation and climate, Susie Lake, British Columbia, Canada.

Spooner, I.S., Hills, L.V., Osborn, G.D., *Arctic and alpine research,* May 1997, 29(2), p.156-163, 35 refs.

Climatology, Climatic changes, Paleoecology, Lacustrine deposits, Alpine landscapes, Forest lines, Vegetation patterns, Palynology, Drill core analysis, Geochronology, Canada—British Columbia—Susie Lake

51-5520

Pedogenesis in alpine ecosystems of the eastern Uinta Mountains, Utah.

Bockheim, J.G., Koerner, D., *Arctic and alpine research,* May 1997, 29(2), p.164-172, 43 refs.

Mountain soils, Soil formation, Alpine landscapes, Ecosystems, Soil analysis, Geochemistry, Particle size distribution, Sedimentation, Eolian soils, United States—Utah—Uinta Mountains

51-5521

Spruce and fir regeneration and climate in the forest-tundra ecotone of Rocky Mountain National Park, Colorado, U.S.A.

Hessl, A.E., Baker, W.L., *Arctic and alpine research,* May 1997, 29(2), p.173-183, 55 refs.

Forest ecosystems, Forest tundra, Revegetation, Vegetation patterns, Climatic changes, Environmental impact, Snow depth, Snow cover effect, Statistical analysis, United States—Colorado—Rocky Mountain National Park

51-5522

Early succession patterns with a native species seed mix on amended and unamended coal mine spoil in the Rocky Mountains of southeastern British Columbia, Canada.

Smyth, C.R., *Arctic and alpine research,* May 1997, 29(2), p.184-195, Refs. p.193-195.

Land reclamation, Revegetation, Plant ecology, Growth, Mining, Pits (excavations), Soil chemistry, Nutrient cycle, Vegetation patterns, Canada—British Columbia—Rocky Mountains

51-5523

Altitudinal turnover and species richness variation in European montane dung beetle assemblages.

Jay-Robert, P., Lobo, J.M., Lumaret, J.P., *Arctic and alpine research,* May 1997, 29(2), p.196-205, Refs. p.203-205.

Alpine landscapes, Ecology, Biomass, Altitude, Distribution, Soil tests, Classifications, Biogeography, Statistical analysis

51-5524

Vertical distribution of mycorrhizal colonization, root hairs, and belowground biomass in three contrasting sites from the tropical high mountains, Mérida, Venezuela.

Barnola, L.G., Montilla, M.G., *Arctic and alpine research,* May 1997, 29(2), p.206-212, 37 refs.

Mountain soils, Alpine landscapes, Ecosystems, Surface drainage, Soil microbiology, Biomass, Distribution, Roots, Fungi, Topographic effects, Statistical analysis, Venezuela—Mérida

51-5525

Size and characteristics of a natural seed bank in Antarctica.

McGraw, J.B., Day, T.A., *Arctic and alpine research,* May 1997, 29(2), p.213-216, 32 refs.

Grasses, Plant ecology, Growth, Vegetation patterns, Migration, Soil tests, Antarctica—Stepping Stones, Antarctica—Bonaparte Point

The seed banks of *Colobanthus quitensis* and *Deschampsia antarctica*, the only two vascular plants native to Antarctica, were assayed by collecting soils from two sites near Palmer Station, and germinating seeds in a laboratory germination facility. Both species were found to have a substantial seed bank, comparable in size to those of arctic and alpine species. The buried seed density was not correlated with the local aboveground abundance where both species were present, although at one site where a species was absent from the vegetation it was also not found in the seed community. Antarctic seed banks have important implications for both the decline and spread of plant populations in response to a changing climate. (Auth. mod.)

51-5526

New population of *Colobanthus quitensis* near Arthur Harbor, Antarctica: correlating recruitment with warmer summer temperatures.

Grobe, C.W., Ruhland, C.T., Day, T.A., *Arctic and alpine research,* May 1997, 29(2), p.217-221, 22 refs.

Plant ecology, Distribution, Biogeography, Migration, Vegetation patterns, Climatic factors, Statistical analysis, Antarctica—Gamage Point

The authors discovered a previously unreported population of the antarctic vascular plant *Colobanthus quitensis* (Kunth) Bartl. containing 267 individuals on Gamage Point. Cushion recruitment per mature cushion in the Gamage Point population was positively correlated with mean summer (Dec.-Feb.) air temperatures, suggesting that temperature is an important factor limiting the establishment of *C. quitensis* in the maritime Antarctic. The presence of apparently suitable but uncolonized sites in the proximity of established populations of vascular plants, combined with increasing mean summer air temperatures on the Antarctic Peninsula, suggest that expansion of existing populations and the establishment of new populations on the Antarctic Peninsula is likely to continue. (Auth. mod.)

51-5527

Dictyostelid cellular slime molds from western Alaska, U.S.A., and the Russian far east.

Stephenson, S.L., Landolt, J.C., Laursen, G.A., *Arctic and alpine research,* May 1997, 29(2), p.222-225, 14 refs.

Soil microbiology, Bacteria, Forest soils, Tundra soils, Ecosystems, Distribution, Classifications, Soil composition, Sampling, United States—Alaska, Russia—Magadan

51-5528

Climate of the Gongga Shan Range, Sichuan Province, PR China.

Thomas, A., *Arctic and alpine research,* May 1997, 29(2), p.226-232, 26 refs.

Climatology, Synoptic meteorology, Mountains, Air temperature, Precipitation (meteorology), Insolation, Seasonal variations, Classifications, Slope orientation, Topographic effects, China—Gongga Shan Mountains

51-5529

Climate sensitivity of Franz Josef Glacier, New Zealand, as revealed by numerical modeling.

Oerlemans, J., *Arctic and alpine research,* May 1997, 29(2), p.233-239, 19 refs.

Glacier oscillation, Glacier flow, Glacier mass balance, Profiles, Climatic changes, Air temperature, Albedo, Global warming, Mathematical models, New Zealand—Franz Josef Glacier

51-5530

Aufeis of the Firth River basin, northern Yukon, Canada: insights into permafrost hydrogeology and karst.

Clark, I.D., Lauriol, B., *Arctic and alpine research,* May 1997, 29(2), p.240-252, 34 refs.

Hydrogeology, Arctic landscapes, River basins, River ice, Ice formation, Naleds, Isotope analysis, Permafrost hydrology, Ground water, Subsurface drainage, Runoff, Canada—Yukon Territory—Firth River

51-5531

Forgotten war: a pictorial history of World War II in Alaska and northwestern Canada.

Cohen, S., Missoula, MT, Pictorial Histories Publishing Company, 1988, 2 vols., Vol.1: 260p, 18 refs., published 1981. Vol.2: 254p., 16 refs., published 1988.

Military operation, Cold weather operation, Cold weather construction, Cold weather survival, History, United States—Alaska, Canada

51-5532

Alaska's mountain ranges.

Wuerthner, G., Helena, MT, American Geographic Publishing, 1988, 103p.

Mountains, Alpine landscapes, Alpine glaciation, Mountain glaciers, Glacial geology, Ecosystems, United States—Alaska

51-5533

Simple transient-flow method of measuring thermal conductivity and diffusivity.

Ball, E.F., *Building Research Station, Garston, Watford, Hertfordshire, England. Building research current papers. Research series,* [1967], No.65, 6p., 19 refs. Reprinted from Institute of Refrigeration. Proceedings, Feb. 1967.

Buildings, Construction materials, Heat loss, Thermal conductivity, Temperature measurement

51-5534

Comments by Canadian delegates on Second International Conference on Permafrost and Canadian-Soviet permafrost research.

Brown, R.J.E., ed, *National Research Council Canada. Division of Building Research. Internal report,* July 1974, No.416, 18p. + append.

Permafrost, Research projects, Meetings, International cooperation

51-5535

Estimating the total concentration of volatile organic compounds in soil samples.

Hewitt, A.D., Lukash, N.J.E., MP 4082, Annual Waste Testing and Quality Assurance Symposium, 13th, Arlington, VA, July 6-9, 1997. Proceedings, Washington, D.C., American Chemical Society, 1997, p.98-104, 10 refs.

Soil pollution, Soil tests, Soil chemistry, Soil analysis, Chemical analysis

This manuscript describes an on-site method of estimating the total concentration of volatile organic compounds (VOCs) in soil, relative to a site-specific 0.2 mg/kg working standard. The purpose of this decision tool is to allow on-site sampling activities to incorporate the appropriate soil sample collection and handling protocols necessary for high- and low-level gas chromatography/mass spectrometry analysis. Combining rapid on-site analysis with sampling proce-

dures that limit substrate disaggregation and exposure improves efforts to achieve site-representative estimates for vadose zone contamination.

51-5536

Determination of nitroaromatic, nitramine, and nitrate ester explosives in water using solid phase extraction and GC-ECD.

Walsh, M.E., Ranney, T., MP 4083, Annual Waste Testing and Quality Assurance Symposium, 13th, Arlington, VA, July 6-9, 1997. Proceedings, Washington, D.C., American Chemical Society, 1997, p.113-124, 12 refs.

Military facilities, Explosives, Waste disposal, Soil pollution, Wells, Water pollution, Water chemistry, Chemical analysis

SW-846 Method 8330, the current USEPA method for the analysis of 14 nitroaromatic and nitramine explosives and co-contaminants, uses a liquid chromatograph (LC) equipped with a UV detector. In many environmental laboratories, gas chromatographs (GCs) are the most commonly used instruments because the majority of SW-846 methods for organics are gas chromatographic methods. The desire to make maximum use of GC naturally leads to attempts to substitute GCs for LCs when analyzing for explosives. However, quantitative analysis of explosives by GC is complicated by the thermal lability of some of the analyses, particularly the nitramines. The authors have found, by using high linear carrier gas velocities, deactivated injection port liners, and short wide-bore capillary columns, that the Method 8330 analyses plus nitroglycerin, PETN, and dinitoraniline may be analyzed quantitatively by GC-ECD (gas chromatography-electron capture detector). The GC method provides greater sensitivity than LC, but accurate calibration is more difficult. The UV detector used for the LC analysis has much greater linear range than the ECD used for GC analysis. In addition, the GC instrumentation requires more care than the LC. Specifically, the injection port liner must be changed frequently to maintain accurate determination of the nitramines. Perhaps the most valuable asset of the GC determination, when used in conjunction with LC, is the ability to confirm analyte presence based on two different physical properties: vapor pressure with GC and polarity with LC. When detection is ambiguous using LC, confirmation by GC will be very useful. Documentation and performance data will be submitted to the Office of Solid Waste for consideration of this method as a standard for inclusion in SW-846.

51-5537

On-site analysis of explosives in soil: evaluation of thin-layer chromatography for confirmation of analyte identity.

Nam, S.I., Leggett, D.C., Jenkins, T.F., Stutz, M.H., MP 4084, Annual Waste Testing and Quality Assurance Symposium, 13th, Arlington, VA, July 6-9, 1997. Proceedings, Washington, D.C., American Chemical Society, 1997, p.132-140, 18 refs.

Military facilities, Explosives, Waste disposal, Soil pollution, Soil tests, Soil chemistry, Soil analysis, Chemical analysis

Two colorimetric-based methods are commonly used for on-site analysis of explosives in soil. For the TNT method, acetone soil extracts are reacted with base to produce reddish Janowsky anions. For the RDX method, acetone extracts are acidified and reacted with zinc metal to reduce RDX to nitrous acid, which is further reacted with a Griess reagent to produce a reddish product. In both cases, concentrations are estimated using absorbance measurements at 540 or 507 nm, respectively. The limitations on positive analyte identification with these procedures are that the TNT method also reacts with other polynitroaromatics, such as TNB and DNT, and the RDX method reacts with other nitramines (HMX) and nitrate esters (NG and PETN). The ability to qualitatively differentiate among the various analyses that produce positive responses would greatly enhance the usability of these methods. This study investigated the use of thin-layer chromatography (TLC) as a simple, on-site method to confirm the identity of analyses detected using the colorimetric procedures. Separations using both laboratory-grade and locally available solvents were developed. The combination of petroleum ether:isopropanol (4:1) provided the best separation for the nitroaromatics, and petroleum ether:acetone (1:1) produced the best separation for the nitramines and nitrate esters. Various types of visualization schemes were also investigated. The most sensitive were $TiCl_3$ with dimethylaminocinnamaldehyde for the nitroaromatics, and the Griess reagent with UV exposure for the nitramines. The major limitation of TLC confirmation analysis is that it does not currently provide an analyte detection capability comparable to the colorimetric tests. Using plates with a preconcentration zone and high ratios of soil to solvent, detection levels of about 10 mg/kg seem attainable.

51-5538

Vector feature extraction using adaptive parallel processing.

LaPotin, P.J., McKim, H.L., Comati, J.C., MP 4085, International Airborne Remote Sensing Conference and Exhibition, Copenhagen, Denmark, July 7-10, 1997. Proceedings. Vol.2, Ann Arbor, MI, ERIM (Environmental Research Institute of Michigan) International, Inc., 1997, p.300-304, 6 refs.

Data processing, Image processing, Computer programs

In this paper optimal routing algorithms are proposed for the design and implementation of feedforward neural networks and parallel processors. Feedforward architectures are the focus of the analysis since their organization clearly separates sequential tasks from parallel tasks, and optimal algorithms can be applied to the larger class of recurrent designs. Within the optimal routing algorithms, adaptation methods are used to govern the introduction and distribution of individual processors. The purpose of the adaptation sequence is to produce parallel architectures that are capable of recognizing portrayed test patterns in k≥2 multispectral/hyperspectral bands. Within the adaptation sequence, weight adjustment is used to reward or penalize processing units based upon sampling criteria, architecture size, and pattern classification. Generalized gradient descent algorithms are examined and operating properties are reviewed for use within multiple layer vector extraction models. The operating characteristics of these designs are demonstrated using recursive programming techniques.

51-5539

Design and implementation of the Belarus AN-26 remote sensing system.

LaPotin, P.J., McKim, H.L., Ellis, J.N., Kamely, D., MP 4086, International Airborne Remote Sensing Conference and Exhibition, Copenhagen, Denmark, July 7-10, 1997. Proceedings. Vol.2, Ann Arbor, MI, ERIM (Environmental Research Institute of Michigan) International, Inc., 1997, p.694-698, 4 refs.

Military facilities, Soil pollution, Plant ecology, Plant physiology, Physiological effects, Vegetation patterns, Terrain identification, Aerial surveys, Airborne equipment, Photographic equipment, Mapping, Belarus

In this paper, the technical specifications for the Antonov AN-26 Remote Sensing Platform are provided, and detailed technical guidelines are presented for the design and implementation of the installed sensor suite within the Former Soviet Union Republic of Belarus. The airborne remote sensing platform includes three major systems: (1) Leica RC-30 Aerial Mapping Camera with digitally controlled mount, (2) Digital MultiSpectral Video (DMSV) System with digitally controlled mount, and (3) Trimble Sensor GPS and Navigational GPS. Each system is designed to evaluate specific environmental factors. The Leica RC-30 Aerial Mapping Camera acquires scaled color and color-infrared imagery to precise specifications for the monitoring and evaluation of land use conditions. The DMSV System acquires digital data for the monitoring and detection of vegetative stress. The stress conditions are correlated within specific toxicological samples from the field and are used to create scaled maps of the environmental features found within the Former Strategic Rocket Force (FSRF) installations. The Trimble Sensor GPS and Navigational GPS register the individual frames of data acquired from the Leica RC-30 and DMSV.

51-5540

North of 60. Construction in permafrost: obstacles of soil and climate.

Canada. Indian and Northern Affairs, Ottawa, 1973, 7p., With French version separately paged.

Permafrost distribution, Permafrost beneath roads, Permafrost beneath structures, Permafrost preservation, Frozen ground settling, Engineering geology, Canada

51-5541

Studless tires and their performance to secure safe driving in winter.

Horiuchi, K., International Pacific Conference on Automotive Engineering, 6th, Seoul, Korea, Oct. 28-Nov. 1, 1991, Proceedings. Vol.2, Seoul, Korea Society of Automotive Engineers, Inc., [1991], p.1081-1087.

Tires, Road icing, Rubber ice friction, Traction, Skid resistance, Safety, Japan

51-5542

Development and draining of thermokarst lakes on Gruben Rock Glacier (Wallis). [Entwicklung und Sanierung eines Thermokarstsees am Gruben-Blockgletscher (Wallis)]

Kääb, A., Haeberli, W., Teysseire, P., *Freiburg. Universität. Geographisches Institut. Forschungsberichte,* 1996, No.8, p.145-153, In German with French summary. 10 refs.

Rock glaciers, Glacial hydrology, Glacial lakes, Thermokarst lakes, Lake bursts, Flood control, Drainage, Switzerland

51-5543

Experience with river widening—example of the Emme River. [Erfahrungen mit flußaufweitungen—das Beispiel Birne Emme]

Zarn, B., Hunzinger, L., *Deutscher Verband für Wasserwirtschaft und Kulturbau (DVWK). Schriften,* 1997, No.118, Massnahmen zur naturnahen Gewässerstabilisierung (Measures for environmentally friendly channel stabilization), p.278-294, In German.

River flow, Flow control, Channel stabilization, Water erosion, Soil erosion, Soil conservation, Soil stabilization, Bank protection (waterways), Switzerland

51-5544

Recent experience with armor stone cracking in the Buffalo District.

Marcus, D.W., Buffalo, NY, U.S. Army Corps of Engineers, Buffalo District, [1990], n.p.

Ports, Channel stabilization, Bank protection (waterways), Embankments, Rock fills, Rock mechanics, United States—Erie, Lake

51-5545

How stable is the hanging glacier on Mt. Eiger. [Wie stabil ist der Hängegletscher am Eiger]

Lüthi, M., Funk, M., *Spektrum der Wissenschaft,* May 1997, p.21,22,24, In German.

Glacier surveys, Mountain glaciers, Glacier oscillation, Glacier flow, Slope stability, Icefalls, Avalanche forecasting, Climatic factors, Global warming, Switzerland

51-5546

Some new methods of ice destruction for the control of jams in backwater areas of hydro-power stations.

Tsykin, E.N., CSCE annual conference, Edmonton, Alberta, May 27-28, 1962, Montreal, Canadian Society for Civil Engineering, [1962], p.1207-1220, 12 refs.

Reservoirs, River ice, Ice jams, Ice breaking, Ice cutting, Ice control, Flood control, Amphibious vehicles

51-5547

Photogrammetric analysis of glaciers and permafrost. [Photogrammetrische Analyse von Gletschern und Permafrost]

Kääb, A., *Vermessung, Photogrammetrie, Kulturtechnik,* 1996, No.12, 6p., In German with French and Italian summaries. 11 refs.

Mountain glaciers, Rock glaciers, Glacial lakes, Glacier surveys, Glacier oscillation, Permafrost surveys, Aerial surveys, Photogrammetric surveys

51-5548

Specifications for thermal and environmental evaluations of advanced-technology office buildings.

Persily, A.K., *U.S. National Bureau of Standards. Center for Building Technology. Report,* Nov. 1986, NBSIR 86-3462, 88p., PB87-134326, Refs. passim.

Buildings, Indoor climates, Climate control, Ventilation, Heating, Specifications, Standards, Building codes, United States

51-5549

Estimating the total concentration of volatile organic compounds in soil: a decision tool for sample handling.

Hewitt, A.D., Lukash, N.J.E., SR 97-12, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, 11p., ADA-326 037, 22 refs.

Oil spills, Waste disposal, Soil pollution, Soil tests, Soil chemistry, Soil analysis, Chemical analysis

This report describes an on-site method of estimating the total concentration of Volatile Organic Compounds (VOCs) in soil, relative to a site-specific 0.2-mg/kg standard. This decision tool allows on-site sampling activities to incorporate the appropriate soil sample collection and handling protocols required by different methods of instrumental analysis. Coupling a rapid method for estimating the total VOC concentration with sampling procedures that limit substrate disaggregation and exposure complements efforts to achieve site-representative estimates for vadose zone contamination.

51-5550

Preparing soil samples for volatile organic compound analysis.

Hewitt, A.D., SR 97-11, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Apr. 1997, 20p., ADA-326 015, 32 refs.

Oil spills, Waste disposal, Soil pollution, Soil tests, Soil chemistry, Soil analysis, Chemical analysis

Three equilibrium headspace and three solvent extraction methods of preparing soil samples for determining volatile organic compounds (VOCs) were compared. Soil samples were spiked with five gasoline range aromatic compounds and four chlorinated compounds using two different laboratory procedures that limit volatilization and biodegradation losses. All comparisons were made with sample triplicates of one or more soil types. Recovery efficiencies for the preparation methods depended on soil organic carbon content, octanol-water partition coefficients of specific analytes, length of solvent extraction, and the spiking procedure used. In general, methanol extraction was the most robust method for recovering spiked VOCs. Recovery efficiencies for VOCs with tetraethylene glycol dimethyl ether and poly(propylene)glycol, as well as three equilibrium headspace methods, varied with the parameters tested.

51-5551

Environmental geochemistry of shale-hosted Ag-Pb-Zn massive sulfide deposits in northwest Alaska: natural background concentrations of metals in water from mineralized areas.

Kelley, K.D., Taylor, C.D., *Applied geochemistry,* July 1997, 12(4), p.397-409, 35 refs.

Hydrogeochemistry, Geological surveys, Sediments, Natural resources, Metals, Minerals, Ground water, Water chemistry, Sampling, Streams, Mining, Environmental protection, United States—Alaska—Brooks Range

51-5552

Effect of permafrost on geochemistry in a Canadian peat plateau bog.

Chagué-Goff, C., Fyfe, W.S., *Applied geochemistry,* July 1997, 12(4), p.465-472, 36 refs.

Discontinuous permafrost, Permafrost physics, Permafrost thickness, Geomorphology, Frozen ground chemistry, Geochemistry, Peat, Wetlands, Stratigraphy, Drill core analysis, Seasonal freeze thaw, Canada—Northwest Territories—Bear River

51-5553

Hydrogeochemistry of sulfur isotopes in the Kalix River catchment, northern Sweden.

Ingri, J., Torssander, P., Andersson, P.S., Mörth, C.M., Kusakabe, M., *Applied geochemistry,* July 1997, 12(4), p.483-496, 34 refs.

Hydrogeochemistry, Subarctic landscapes, Watersheds, Snow hydrology, Snowmelt, Meltwater, River flow, Hydrologic cycle, Geochemical cycles, Water transport, Surface drainage, Isotope analysis, Sampling, Seasonal variations, Sweden—Kalix River

51-5554

Exhumed hydrocarbon traps in East Greenland: analogs for the Lower-Middle Jurassic play of northwest Europe.

Price, S.P., Whitham, A.G., *AAPG bulletin,* Feb. 1997, 81(2), p.196-221, Refs. p.218-221.

Geological surveys, Hydrocarbons, Migration, Reservoirs, Tectonics, Stratigraphy, Lithology, Diagenesis, Classifications, Greenland

51-5555

Hydraulic conductivity of geosynthetic clay liners after freeze-thaw.

Hewitt, R.D., Daniel, D.E., *Journal of geotechnical and geoenvironmental engineering,* Apr. 1997, 123(4), p.305-313, 38 refs.

Linings, Geotextiles, Clays, Synthetic materials, Soil freezing, Phase transformations, Freeze thaw tests, Hydraulics, Soil water migration, Simulation, Performance

51-5556

Mass balance of circum-arctic glaciers and recent climate change.

Dowdeswell, J.A., et al, *Quaternary research,* July 1997, 48(1), p.1-14, 48 refs.

Climatology, Climatic changes, Glacier oscillation, Glacier mass balance, Glacier surveys, Glacial meteorology, Polar atmospheres, Air temperature, Ice air interface, Seasonal variations

51-5557

Magnetic polarity and fission-track chronology of a Late Pliocene-Pleistocene paleoclimatic proxy record in the tropical Andes.

Helmens, K.F., Barendregt, R.W., Enkin, R.J., Baker, J., Andriessen, P.A.M., *Quaternary research,* July 1997, 48(1), p.15-28, 29 refs.

Paleoclimatology, Pleistocene, Quaternary deposits, Stratigraphy, Remanent magnetism, Sedimentation, Geomagnetism, Polarization (charge separation), Volcanic ash, Geochronology, Correlation, Andes

51-5558

Evidence for cirque glaciation in the Colorado Front Range during the Younger Dryas chronozone.

Menounos, B., Reasoner, M.A., *Quaternary research,* July 1997, 48(1), p.38-47, Refs. p.46-47.

Pleistocene, Alpine glaciation, Glacial geology, Glacier oscillation, Cirque glaciers, Moraines, Lacustrine deposits, Quaternary deposits, Radioactive age determination, Drill core analysis, United States—Colorado—Front Range

51-5559

Glacial and postglacial pollen records from the Ecuadorian Andes and Amazon.

Colinvaux, P.A., Bush, M.B., Steinitz-Kannan, M., Miller, M.C., *Quaternary research,* July 1997, 48(1), p.69-78, Refs. p.77-78.

Paleoclimatology, Climatic changes, Paleoecology, Quaternary deposits, Palynology, Lacustrine deposits, Moraines, Stratigraphy, Vegetation patterns, Temperature effects, Ecuador—Andes

51-5560

Holocene tree line and climate change on the Queen Charlotte Islands, Canada.

Pellatt, M.G., Mathewes, R.W., *Quaternary research,* July 1997, 48(1), p.88-99, Refs. p.98-99.

Paleoclimatology, Climatic changes, Quaternary deposits, Lacustrine deposits, Paleoecology, Forest lines, Palynology, Radioactive age determination, Geochronology, Canada—British Columbia—Queen Charlotte Islands

51-5561

Late-Holocene expansion of eastern larch (*Larix laricina* [Du Roi] K.Koch) in northwestern Québec.

Peñalba, M.C., Payette, S., *Quaternary research,* July 1997, 48(1), p.114-121, 26 refs.

Paleoecology, Trees (plants), Distribution, Migration, Vegetation patterns, Palynology, Quaternary deposits, Correlation, Radioactive age determination, Canada—Quebec

51-5562

Antifreeze enzymes for polar algae. [Der Einfluß kompatibler Substanzen und Kryoprotektoren auf die Enzyme Malatdehydrogenase (MDH) und Glucose-6-phosphat-Dehydrogenase (G6P-DH) aus *Acrosiphonia arcta* (Chlorophyta) der Arktis und Antarktis]

Kück, K., *Berichte zur Polarforschung,* 1997, No.227, 127p., In German with English summary. Refs. p.109-125.

Low temperature research, Chemical properties, Plant physiology, Algae, Antifreezes, Antarctica—King George Island

Polar macroalgae are not only exposed to permanent cold but may also be damaged from complete freezing on a cellular level. In macroalgae of the polar regions, biochemical properties of the enzyme systems and/or the presence of protective substances such as dimethylsulfoniopropionate (DMSP), proline and sucrose may be of major importance to survive extreme environmental conditions. This study investigated selected enzymes for their activities at low temperatures and their response to additions of potential antifreeze substances. It also verified DMSP, proline and sucrose not only as osmolytes but also as compounds with cryoprotective properties at various kinds of temperature stress through chilling and freezing. The mechanisms and extent of the protective effects are very specific and exhibit high enzyme specificity as well. (Auth. mod.)

51-5563

Biology and ecology of cryopelagic amphipods from Arctic sea ice. [Biologische und ökologische Untersuchungen zur kryopelagischen Amphipodenfauna des arktischen Meereises]

Poltermann, M., *Berichte zur Polarforschung,* 1997, No.225, 170p., In German with English summary. Refs. p.154-166.

Sea ice, Marine biology, Cryobiology, Ice bottom surface, Subsurface investigations, Russia—Franz Josef Land, Russia—Laptev Sea, Barents Sea

51-5564

Tropospheric ozone variations in polar regions. [Troposphärische Ozonvariationen in Polarregionen]

Wessel, S., *Berichte zur Polarforschung,* 1997, No.224, 188p., In German with English summary. Refs. p.141-152.

Atmospheric composition, Ozone, Models, Climatic changes, Polar regions, Troposphere

A close examination was made of the chemical and dynamical processes at work during the tropospheric ozone minima in both polar regions. Analysis of the results of this phase led to the construction of a scenario of four statements on which a model calculation was established: sea-salt aerosols can be accumulated on the snow surface during polar winters in the region between the boundaries of summer and winter sea ice; the accumulated sea-salt bromide can be liberated by oxidation with hydrogen peroxide after polar sunrise; hydrogen peroxide can also accumulate on the snow surface through precipitation of snow or rain; inside the liquid layer of the snow surface, hydrogen peroxide can oxidize bromide to molecular bromine which is then liberated to the gas phase; molecular bromine is photolyzed to form bromine atoms which react with ozone and initiate a catalytic ozone destruction; and the ozone depleted air parcel is transported to the measuring site. (Auth. mod.)

51-5565

Environmentally safe water-urea-ammonium nitrate mixtures for melting snow and ice.

Kerti, J., Kardos, P., Kalman, T., *PCT International. Patent,* Nov. 7, 1996, 19p., WO 9634927.

Ice melting, Snow melting, Artificial melting, Chemical ice prevention

51-5566

Bipolar changes in atmospheric circulation during the Little Ice Age.

Kreutz, K.J., Mayewski, P.A., Meeker, L.D., Twickler, M.S., Whitlow, S.I., Pittalwala, I.I., *Science,* Aug. 29, 1997, 277(5330), p.1294-1296, 52 refs.

Atmospheric circulation, Climatic changes, Ice cores, Storms, Antarctica—West Antarctica

Annually dated ice cores from Siple Dome, West Antarctica and central Greenland indicate that meridional atmospheric circulation intensity increased in the polar South Pacific and North Atlantic at the beginning (ca. 1400) of the most recent Holocene rapid climate change event, the Little Ice Age (LIA). As deduced from chemical concentrations at these core sites, the LIA was characterized by substantial meridional circulation strength variability, and this variability persists today despite strong evidence for an end to LIA cooling. Thus, increased late 20th century storm variability may be in part a result of the continuation of these climatic fluctuations. (Auth.)

51-5567

Hyperactive antifreeze protein from beetles.

Graham, L.A., Liou, Y.-C., Walker, V.K., Davies, P.L., *Nature,* Aug. 21, 1997, 388(6644), p.727-728, 11 refs.

Antifreezes, Microbiology

51-5568

Air Force Programs at APL: Flare genesis project.

Bythrow, P.F., *Johns Hopkins APL technical digest,* Mar. 1996, 17(1), p.117-126 (Pertinent p.119-120), 6 refs.

DLC TA1.J524 v.17 1996

Atmospheric physics, Measuring instruments, Solar activity, Magnetic surveys, Balloons, Antarctica

The Applied Physics Laboratory is engaged in several diverse projects for the U.S. Air Force. These programs, which are distributed among various Laboratory departments, include flare genesis, an antarctic balloon mission to study the solar magnetic field. (Auth.)

51-5569

Thermocouple reference tables based on the IPTS-68.

Powell, R.L., et al, *U.S. National Bureau of Standards. NBS monograph,* 1974, No.125, 401p., COM-74-50351, 64 refs. IPTS is an acronym for International Practical Temperature Scale.

Temperature measurement, Thermocouples, Standards, Cryogenics, Low temperature research

51-5570

Physical processes and natural attenuation alternatives for remediation of white phosphorus contamination, Eagle River Flats, Fort Richardson, Alaska.

Lawson, D.E., Hunter, L.E., Bigl, S.R., CR 96-13, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* Dec. 1996, 65p., ADA-327 890, 37 refs.

Soil pollution, Water pollution, Estuaries, Explosives, Environmental impact, Waste disposal, Drainage, Water erosion, Sediment transport, Military facilities, Land reclamation, United States—Alaska—Fort Richardson

This report describes the results of investigations into the role of tidal flat physical systems in the natural attenuation of white phosphorus (WP) contamination in Eagle River Flats (ERF) on Fort Richardson, AK. Waterfowl feeding in ponds and marshes here ingest the WP and die. These investigations found that natural attenuation and in-situ degradation of the WP could result from certain physical phenomena operating within the ERF ecosystem. Specifically, the ongoing erosion and headward recession in the gullies will drain large areas of contaminated ponds in an estimated 1 to 10 years. Lowering of water levels should lead to in-situ WP degradation and natural attenuation as pond sediments dry. Annual sedimentation rates in some ponds and marshes are sufficient to bury WP in several years or more and thereby reduce the exposure to feeding waterfowl. Ice and water are also effective transporters of WP, moving it about ERF and into Eagle River and eventually into Knik Arm where its fate is unknown. Certain areas of ERF will require artificial drainage, but natural conditions can be restored following treatment. Recommendations are made for the use of natural attenuation and additional studies that are required to ensure the successful clean-up of ERF.

51-5571

Collecting micrometeorites from the South Pole Water Well.

Taylor, S., Lever, J.H., Harvey, R.P., Govoni, J., CR 97-01, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* May 1997, 37p., ADA-327 829, 36 refs.

Wells, Water supply, Meltwater, Ice sampling, Impurities, Cosmic dust, Antarctica—Amundsen-Scott Station

A collector was designed and built to retrieve micrometeorites from the floor of the South Pole Water Well. The large volume of firn and ice being melted for the well and the low component of terrestrial material in antarctic ice make the South Pole Water Well an ideal place to collect micrometeorites. Because the age of the ice being melted is known, yearly or periodic collections provide large numbers of micrometeorites of known terrestrial age. The collector was designed to pose no threat to the well's water quality, to be reliable and easy to operate, and to collect particles larger than 50 μm. This report details how this collector was built and tested and documents the rationale behind some of the design choices. It also includes preliminary findings from the first deployment. (Auth.)

51-5572

River ice data instrumentation.

Kay, R.L., White, K.D., CR 97-02, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* June 1997, 40p., ADA-327 882, 70 refs.

River ice, Ice jams, Ice conditions, Ice detection, Ice surveys, Ice reporting, Ice forecasting, Flood forecasting, Radar tracking, Measuring instruments, Telemetering equipment, Data transmission

Ice processes are capable of causing damage to Corps of Engineers flood control, water control, and navigation projects each year. Monitoring of ice and other physical parameters is done by instrumentation in some instances but is usually done manually. Measurements that require personnel to go on an ice cover can be risky or impossible, depending on the ice cover's stability and the individual's training. This study seeks to identify and rank the field measurements needed during winter conditions and the instrumentation required to make the measurements. Existing and developing instrumentation was evaluated for in-situ and remote sensing capabilities. Methods of transmitting, storing, and retrieving various types of ice data were explored for feasibility and practicality. Recommendations are identified regarding the types of instrumentation, data transmission, and storage methods that need to be improved or developed.

51-5573

Empirical method to derive hourly temperature frequencies for locations possessing only summarized climate information.

Krause, P.F., *U.S. Army Corps of Engineers. Topographic Engineering Center. Report,* June 1997, TEC-0097, 235p., Refs. p.219-226.

Air temperature, Surface temperature, Weather stations, Meteorological data, Weather forecasting, Frost forecasting, Statistical analysis

51-5574

Preproduction qualification test (PPQT) for the Intermediate Cold-Wet Boot (ICWB), the Extreme Cold-Weather Boot (ECWB), and the second generation Extended Cold-Weather Clothing System (2GECWCS) insulating liners.

Davis, J.B., Dudek, W.A., Molyneaux, W., Carter, F., U.S. Army Test and Evaluation Command TECOM Project No.8-EI-495-ECB-001, Fort Greely, AK, U.S. Army Cold Regions Test Center, May 1997, 49p. + appends., 10 refs.

Clothing, Thermal insulation, Military equipment, Cold weather tests, Human factors engineering

51-5575

Annual report 1996.

Canada. National Energy Board. Environmental Studies Research Funds, Calgary, Alberta, Feb. 1997, 13p., With French version separately paged. Includes list of about 130 reports published by the ESRF (Environmental Studies Research Funds).

Organizations, Research projects, Petroleum industry, Economic development, Exploration, Offshore drilling, Icebergs, Ice scoring, Cost analysis, Canada

51-5576

Characterisation of iceberg pits on the Grand Banks of Newfoundland.

Davidson, S.H., Simms, A., *Canada. Environmental Studies Research Funds. Report,* Feb. 1997, No.133, 162p., With French summary. Refs. p.157-162.

Icebergs, Ice scoring, Ice erosion, Oceanographic surveys, Marine geology, Ocean bottom, Bottom sediment, Bottom topography, Canada—Newfoundland—Grand Banks

51-5577

1990 Beaufort Sea ice scour repetitive mapping program.

Myers, R., Blasco, S., Shearer, J., *Canada. Environmental Studies Research Funds. Report,* Mar. 1996, No.129, 147p. + appends. + maps (2 vols.), With French summary. 29 refs. Vol.1: main report and appendices. Vol.2: maps in a separate box.

Ice scoring, Ice erosion, Oceanographic surveys, Echo sounding, Ocean bottom, Bottom topography, Topographic maps, Beaufort Sea

51-5578

Is blasting of ice jams an effective mitigation strategy?

White, K.D., Kay, R.L., MP 4087, *Journal of cold regions engineering,* Sep. 1997, 11(3), p.171-179, 12 refs.

River ice, Flooding, Ice jams, Ice blasting, Ice control, Explosives, Explosion effects, Safety, Performance, Standards

There are few mitigation measures that can be used for emergency response to ice jam flooding other than traditional techniques such as sandbagging and evacuation. Among these ice-jam-specific measures are ice breaking, mechanical ice removal, and blasting. Options may be further limited for grounded ice jams, jams located on wide, shallow rivers, or jams located in areas with poor access. In such cases, blasting of an ice jam may be the most effective or efficient ice jam mitigation measure. In some cases, blasting is the only mitigation measure that can be applied. Blasting operations are hazardous because of the potential for disaster associated with the use of explosives, such as untimely detonation of charges leading to serious injury or death. Liability issues now appear to be the greatest obstacle to the use of blasting in ice jam emergency mitigation. Blasting can be an effective ice jam mitigation measure when a plan that has been prepared in advance is put into action rapidly, while there is still sufficient flow to move the blasted ice.

51-5579

Low temperature strength and notch sensitivity of glass mat polypropylene.

Lindhagen, J., Berglund, L., *Journal of cold regions engineering,* Sep. 1997, 11(3), p.180-197, 31 refs.

Composite materials, Synthetic materials, Construction materials, Cold weather construction, Polymers, Cellular plastics, Low temperature tests, Damage, Strain tests, Microstructure, Tensile properties, Temperature effects, Mathematical models

51-5580

Low-cost ice-control structure.

Lever, J.H., Gooch, G., Tuthill, A., Clark, C., MP 4088, *Journal of cold regions engineering,* Sep. 1997, 11(3), p.198-220, 18 refs.

River ice, Ice jams, Ice breakup, Floodplains, Frazil ice, Ice control, Hydraulic structures, Concrete structures, Piers, Construction, Cost analysis, Models, Simulation

A new, low-cost structure appears to be well suited to control breakup ice jams on small rivers. It consists of massive sloped blocks, partially buried in riprap, placed across the river adjacent to a natural floodplain. The blocks will arrest a breakup ice run and form a stable, partially grounded ice jam. Trees or boulders on the floodplain retain ice pieces in the river channel while allowing flow to bypass the structure. Large gaps between blocks allow easy fish and canoe passage. Refrigerated hydraulic model tests indicate that the structure should perform well even during severe breakup events. A prototype built in Hardwick, VT, has performed well during the four mild breakup events experienced to date. Its cost of $3,600/m of river width represents about an order-of-magnitude reduction compared with previous ice-control structures.

51-5581

Evaluation of bioremediation in cold regions.

Tumeo, M.A., Guinn, D.A., *Journal of cold regions engineering,* Sep. 1997, 11(3), p.221-231, Refs. p.228-231.

Soil microbiology, Soil conservation, Bacteria, Hydrocarbons, Degradation, Soil pollution, Environmental impact, Environmental protection, Countermeasures

Biological treatment has become increasingly popular as a remediation method for soils and ground water contaminated with petroleum hydrocarbon, chlorinated solvents, and pesticides. Bioremediation has been considered for application in cold regions such as arctic and subarctic climates and Antarctica. Studies to date suggest that indigenous microbes suitable for bioremediation exist in soils in these regions. This paper reports on two case studies in which indigenous bacteria were found that were capable of mineralizing petroleum hydrocarbons in soil contaminated with jet fuel and polychlorinated biphenyls (PCBs) in Antarctica and pentachlorophenol (PCP) and diesel in contaminated soil in the subarctic Alaska. However, in both instances, ex-situ bioremediation was recommended for treatment of the contaminated soil because ex-situ treatment allows greater control over soil temperature, a limiting factor in cold climates. (Auth. mod.)

51-5582

Modeling ice passage at Starved Rock Lock and Dam on Illinois Waterway.

Tuthill, A., Gooch, G., MP 4089, *Journal of cold regions engineering,* Sep. 1997, 11(3), p.232-243, 6 refs.

Locks (waterways), Dams, River ice, Channels (waterways), Navigation, Ice passing, Ice control, Hydraulic structures, Subsurface structures, Bubbling, Simulation, Models, United States—Illinois—Illinois Waterway

A physical hydraulic model study, using real ice, investigated the design and operation of submergible gates for ice passage at the U.S. Army Corps of Engineers Starved Rock Lock and Dam on the Illinois Waterway. Alternative gate locations were tested for a range of gate discharges and ice conditions. The effects of hydropower diversions, navigation, and high-flow air screens on ice passage were examined. The study found that, under some ice conditions, submergible gates alone may not be adequate for ice passage. During these times, tow and barge transits through the lock and deflector bubbler operation would need to be coordinated with submergible gate operation to pass ice.

51-5583

Feasibility study on freeze/thaw conditions of pulp mill waste activated sludge.

Parker, P.J., Collins, A.G., *Journal of cold regions engineering,* Sep. 1997, 11(3), p.245-250, 12 refs.

Waste disposal, Sludges, Waste treatment, Freeze thaw cycles, Water content, Filters, Freeze thaw tests, Sedimentation, Drainage, Tests, Mechanical properties, Capillarity

51-5584

Parameterization of tropical cirrus ice crystal size distributions and implications for radiative transfer: results from CEPEX.

McFarquhar, G.M., Heymsfield, A.J., *Journal of the atmospheric sciences,* Sep. 1, 1997, 54(17), p.2187-2200, 38 refs.

Cloud physics, Optical properties, Ice crystal size, Particle size distribution, Ice crystal optics, Light scattering, Albedo, Water content, Mathematical models

51-5585

Parameterization of the visible extinction coefficient of ice clouds in terms of the ice/water content.

Platt, C.M.R., *Journal of the atmospheric sciences,* Aug. 15, 1997, 54(16), p.2083-2098, 41 refs.

Cloud physics, Ice crystal optics, Ice crystal size, Spectra, Particle size distribution, Water content, Ice water interface, Radiation absorption, Attenuation, Climatic factors, Temperature effects, Mathematical models

51-5586

Surface wave propagation in shallow water beneath an inhomogeneous ice cover.

Marchenko, A.V., Voliak, K.I., *Journal of physical oceanography,* Aug. 1997, 27(8), p.1602-1613, 14 refs.

Oceanography, Sea ice, Water waves, Gravity waves, Wave propagation, Scattering, Ice water interface, Ice cover effect, Ice surface, Surface structure, Pressure ridges, Mathematical models

51-5587

Multiphonon contributions in inelastic neutron scattering spectra of ice.

Kolesnikov, A.I., Li, J.C., *Physica B,* June 1997, Vol.234-236, European Conference on Neutron Scattering, 1st, Interlaken, Switzerland, Oct. 8-11, 1996. Proceedings, p.34-36, 8 refs.

Ice physics, Deuterium oxide ice, Neutron scattering, Ice spectroscopy, Spectra, Vibration

51-5588

Small-angle neutron scattering study of frozen solutions.

Almásy, L., Cser, L., Dézsi, I., Káli, G., *Physica B,* June 1997, Vol.234-236, European Conference on Neutron Scattering, 1st, Interlaken, Switzerland, Oct. 8-11, 1996. Proceedings, p.82-83, 2 refs.

Ice physics, Ice spectroscopy, Frozen liquids, Amorphous ice, Ice density, Solutions, Metals, Neutron scattering, Phase transformations, Temperature effects, Viscosity

51-5589

Structure and diurnal variation of the atmospheric boundary layer over a mid-latitude glacier in summer.

Van den Broeke, M.R., *Boundary-layer meteorology,* May 1997, 83(2), p.183-205, 37 refs.

Atmospheric boundary layer, Glacial meteorology, Glacier surfaces, Turbulent boundary layer, Turbulent exchange, Ice air interface, Wind velocity, Wind direction, Diurnal variations, Gravity

51-5590

Target detection and tracking with HF radar using reciprocal SAR techniques.

Khan, R.H., *IEEE aerospace and electronic systems magazine,* Jan. 1997, 12(1), p.40-43, 6 refs.

Synthetic aperture radar, Icebergs, Radar tracking, Ice detection, Sensor mapping, Radar echoes, Ice reporting

51-5591

Autocorrelation functions of granular media with free arrangement of spheres, spherical shells or ellipsoids.

Mätzler, C., *Journal of applied physics,* Feb. 1, 1997, 81(3), p.1509-1517, 20 refs.

Snow physics, Surface structure, Snow optics, Grain size, Spheres, Particles, Light scattering, Analysis (mathematics), Statistical analysis, Correlation

51-5592

Mathematical visualisation of the northern Bering Sea's summer ecohydrodynamics.

Nihoul, J.C.J., Adam, P., Brasseur, P., NATO Advanced Research Workshop on Data Assimilation: Tools for modelling the Ocean in a Global Change Perspective, Liège, Belgium, May, 1993. Proceedings. Edited by P.P. Brasseur and J.C.J. Nihoul and NATO ASI, Series I. Global Environmental Change. Vol.19, Berlin, Springer-Verlag, 1994, p.107-134, 15 refs.

DLC GC10.4.M36 D38

Oceanography, Ocean currents, Hydrography, Plankton, Ecosystems, Hydrodynamics, Geochemistry, Seasonal variations, Imaging, Data processing, Mathematical models, Bering Sea

51-5593

Model simulations of tides and shelf waves along the shelves of the Norwegian-Greenland-Barents Sea.

Gjevik, B., Modeling marine systems. Vol.1. Edited by A.M. Davies, Boca Raton, CRC Press, 1990, p.187-219, 31 refs.

DLC GC10.4.M36 M6

Oceanography, Ocean currents, Tidal currents, Water waves, Velocity, Air water interactions, Atmospheric pressure, Diurnal variations, Mathematical models, Fluid dynamics, Barents Sea, Norwegian Sea, Greenland Sea

51-5594

GPS epoch measurements spanning the mid-Atlantic plate boundary in northern Iceland 1987-1990.

Jahn, C.H., Seeber, G., Foulger, G.R., Einarsson, P., *American Geophysical Union. Geophysical monograph,* 1994, No.82, Gravimetry and space techniques applied to geodynamics and ocean dynamics. Edited by B.E. Schultz et al. IUGG vol.17, p.109-123, 30 refs.

DLC GC10.4.R4 G93

Marine geology, Tectonics, Earth crust, Subpolar regions, Geophysical surveys, Geodetic surveys, Magma, Volcanoes, Fracture zones, Viscoelasticity, Radio waves, Scintillation, Iceland

51-5595

Dating ash-layers in glaciers of Livingston I. [Los niveles de cenizas de los glaciares de Livingston. Criterio para su datación]

Calvet, J., Pallàs, R., Sàbat, F., Vilaplana, J.M., Actas del V Simposio Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 5th. Proceedings). Edited by J. Cacho and D. Serrat, Madrid, Comisión Interministerial de Ciencia y Tecnologia, [1994], p.195-208, In Spanish with English summary. Refs. p.207-208.

Glacial geology, Geochronology, Volcanic ash, Glacier surveys, Impurities, Antarctica—Livingston Island

Glaciers along the coast of Livingston I. end in ice-cliffs several tens of meters high which show many layers of volcanic ash. According to a similar pattern at the sites studied, these ash-layers seem to have a homogeneous distribution all around the island. Assuming that the ash is of volcanic origin, the literature covering volcanic eruptions on Deception I. is reviewed, as are the studies of lacustrine sediments of Byers Peninsula, to estimate the age of the ash-layers on Livingston I. It is concluded that the lowest layers may correspond to eruptions which occurred at the beginning of the 19th century.

51-5596

Geothermal anomalies and permafrost on Deception I. [Anomalías geotérmicas y permafrost en la Isla Decepción, Antártida]

López, J., Ramos, M., Criado, C., Serrano, E., Nicolás, P., Actas del V Simposio Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 5th. Proceedings). Edited by J. Cacho and D. Serrat, Madrid, Comisión Interministerial de Ciencia y Tecnologia, [1994], p.223-234, In Spanish with English summary. 17 refs.

Geothermy, Volcanoes, Permafrost depth, Permafrost origin, Permafrost distribution, Antarctica—Deception Island

Temperature distribution in the main area of geothermal anomalies on Deception I., and permafrost development and depth, are discussed. Data show that temperatures decrease with increasing distance from the heat centers, and that most of the anomalies are located in the inner part of the caldera ring. However, vapor emissions at temperatures over 40C were noted outside of the Stonethrow Ridge. The permafrost is widely distributed on the island, with depths between 60 and 96 cm at relatively low altitudes. It is found that the geothermal flux on the island has no significant effect on glaciers' melt.

51-5597

Evaluation of the ice cap fluctuations on Livingston I., 1956-1991, from satellite images of Moon Bay. [Evaluación de las fluctuaciones del casquete glaciar en la zona de Bahía Moon - Isla Livingston, entre 1956 y 1991, a partir del cálculo de parámetros estructurales y texturales en fotografías aéreas e imagenes de satélite]

Corbera, J., Granada, F., Ballester, N., Calvet, J., Actas del V Simposio Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 5th. Proceedings). Edited by J. Cacho and D. Serrat, Madrid, Comisión Interministerial de Ciencia y Tecnologia, [1994], p.243-257, In Spanish with English summary. 7 refs.

Ice cover thickness, Ice structure, Glacier oscillation, Spaceborne photography, Topographic surveys, Antarctica—Moon Bay

To determine ice cover oscillations on Livingston I., an evaluation was made of textural and structural parameters in Moon Bay. Five conventional texture parameters (uniformity, inertia, entropy, inverse different moment, maximum probability) were calculated from Landsat images. Laplacian images were elaborated to study the distribution and shapes of crevasses, and aerial photographs were used for ice cliff profiles and the determination of geomorphological processes. The relationship between those parameters and the fluctuations of the ice cap is discussed. (Auth. mod.)

51-5598

Ice cap fluctuation on Greenwich I., 1956-1991. [Fluctuaciones del casquete glaciar de la Isla Greenwich (Shetlands del Sur) en el período 1956-1991]

Ballester, N., Granada, F., Corbera, J., Calvet, J., Actas del V Simposio Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 5th. Proceedings). Edited by J. Cacho and D. Serrat, Madrid, Comisión Interministerial de Ciencia y Tecnologia, [1994], p.259-264, In Spanish with English summary. 4 refs.

Ice cover thickness, Glacier oscillation, Spaceborne photography, Surface properties, Remote sensing, Antarctica—Greenwich Island

This paper presents the results of monitoring of the ice cap fluctuations on Greenwich I. from aerial photographs taken in 1956-57, and satellite images taken in 1986 (Landsat-4.MSS), 1988 (Landsat-5.TM), 1989 (Landsat-5.TM) and 1991 (panchromatic SPOT). A very significant retreat has been observed between 1956 and 1991, close to 4% of the ice cap surface, although a few advances were noted during 1988-89. (Auth. mod.)

51-5599

Fold formation in glacier lobes on Hurd Peninsula. [Formación de pliegues en lóbulos de glaciares de casquete. Ejemplos del glaciar de la Península Hurd (Isla Livingston)]

Casas, J.M., Calvet, J., Pallàs, R., Santanach, P., Vilaplana, J.M., Actas del V Simposio Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 5th. Proceedings). Edited by J. Cacho and D. Serrat, Madrid, Comisión Interministerial de Ciencia y Tecnología, [1994], p.265-277, In Spanish with English summary. 14 refs.

Ice deformation, Glacier beds, Glacier surfaces, Crevasses, Ice structure, Antarctica—Hurd Peninsula

The Hurd glacier covers the eastern part of Livingston I.; interlayered dark pyroclastic rocks delineate the bedding and constitute a characteristic feature. A 3-D glacier pattern was obtained from mapping of the bedding on the glacier snow-free surface, together with the glacier cliff and crevasse outcrops. The structure of two different lobes, the BAE and Johnson lobes, shows bedding, cleavage, thrusts, unconformities and detachment planes. In both lobes, folds are the most striking feature; they deform the bedding and are related to planar structures. Folds range from few centimeters to hundreds of meters in size, from open to tight or isoclinal, generally asymmetric and recumbent. Fold axis ranges from oblique to parallel to ice flow direction. Axial surfaces vary from subhorizontal, near the base of the glacier, to step-dipping or subvertical on the surface. Fold location also varies from the margin (BAE lobe) to the center (Johnson lobe) of the glacier. (Auth. mod.)

51-5600

Snow cover characteristics and evolution on Livingston I. [Características y evolución del manto nivoso en Isla Livingston]

Vilaplana, J.M., Pallàs, R., Actas del V Simposio Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 5th. Proceedings). Edited by J. Cacho and D. Serrat, Madrid, Comisión Interministerial de Ciencia y Tecnología, [1994], p.279-290, In Spanish with English summary. 16 refs.

Snow stratigraphy, Grain size, Snow temperature, Snow density, Wind factors, Snowdrifts, Structural analysis, Antarctica—Livingston Island

Observations and measurements obtained from 6 snow pits on Hurd Peninsula showed the following: along all the profiles, snow layers consisted of large grounded grains, with several layers of interstratified ice crusts; the mean snow density value was 0.5 gr/cm^3, and the temperature was always higher than 0.7°C. The ice crusts corresponded to periods in which temperatures were above 0°C; during the winter of 1991-1992, several periods of high temperatures occurred. Data analysis allowed to establish the snow equilibrium line at about 235 m above sea level. Wind effects on Livingston I. snow fields, observed and measured at 4 different locations, show snow drifts and erosive structures generated by ENE winds. (Auth. mod.)

51-5601

Spectrometry network for equilibrium studies of the NO_x-O_3 system. [Red de espectrómetros para el estudio del equilibrion del sistema NO_x-O_3]

Gil, M., Yela, M., Rodríguez, S., Cacho, J., Actas del V Simposio Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 5th. Proceedings). Edited by J. Cacho and D. Serrat, Madrid, Comisión Interministerial de Ciencia y Tecnología, [1994], p.345-353, In Spanish with English summary. 10 refs.

Research projects, Ozone, Stratosphere, Meteorological instruments, Solar radiation, Atmospheric composition, Seasonal variations, Antarctica—West Antarctica

An ongoing program between Spain and Argentina designed to study the lower stratosphere, particularly the evolution of NO_2 and O_3 in West Antarctica, is outlined. The design and installation plans of three units of diffused-solar-light spectrometers, operating in the blue-violet areas of the spectrum, are discussed and illustrated. Three sites were selected for network operations: Ushuaia and the Marambio and Belgrano stations.

51-5602

Environmental data-transmission network. [Red de transmisión de datos para aplicaciones medioambientales]

Moroño, S., González, E., Ramos, M., Actas del V Simposio Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 5th. Proceedings). Edited by J. Cacho and D. Serrat, Madrid, Comisión Interministerial de Ciencia y Tecnología, [1994], p.429-438, In Spanish with English summary. 6 refs.

Telecommunication, Telemetering equipment, Data transmission, Ecology, Geomorphology, Polar regions

The development of a network for transmission of ecological and geomorphological data in Antarctica is reported. The aim is to monitor by remote control, and register the evolution, of environmental parameters acquired at a number of sampling points in the target area. Characteristics of the network are described and the design of its central unit is explained and illustrated. (Auth. mod.)

51-5603

Accumulators as a source of electric power supply for automatic recording systems. [Comportamiento de acumuladores como fuente de energía eléctrica para la alimentación de sistemas automáticos de registro]

Ramos, M., Relinque, J.I., Actas del V Simposio Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 5th. Proceedings). Edited by J. Cacho and D. Serrat, Madrid, Comisión Interministerial de Ciencia y Tecnología, [1994], p.439-454, In Spanish with English summary. 9 refs.

Electric power, Electronic equipment, Batteries, Computer applications, Recording, Weather stations, Cold weather performance, Antarctica—Juan Carlos I Station

Results are presented of experimental studies carried out at the Juan Carlos I Station of the performance, at very low discharge intensity (0.005°C), of different types of batteries operating in 0°C to -35°C temperatures designed to supply electrical power to automatic recording systems. The equipment tested is described and its installation is illustrated and discussed.

51-5604

Performance of batteries at low discharge intensity and low temperatures. [Comportamiento de baterías primarias en descargas lentas a bajas temperaturas]

Ramos, M., Mora, M., Actas del V Simposio Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 5th. Proceedings). Edited by J. Cacho and D. Serrat, Madrid, Comisión Interministerial de Ciencia y Tecnología, [1994], p.455-467, In Spanish with English summary. 6 refs.

Low temperature research, Batteries, Cold weather performance

This paper describes an experimental study of the performance, at very low discharge intensity and low temperature conditions, of different commercial batteries (primary cells), such as zinc, alkaline and lithium, as these conditions are representative of most of the data acquisition in Antarctica.

51-5605

Secondary accumulator charge performance in low temperatures. [Comportamiento de carga a bajas temperaturas en acumuladores secundarios]

Ramos, M., Mora, M., Actas del V Simposio Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 5th. Proceedings). Edited by J. Cacho and D. Serrat, Madrid, Comisión Interministerial de Ciencia y Tecnología, [1994], p.469-475, In Spanish with English summary. 6 refs.

Low temperature research, Batteries, Cold weather performance, Charge transfer, Charge measuring instruments, Antarctica—Juan Carlos I Station

Experimental studies were carried out at Juan Carlos I Station to obtain charge performance diagrams for different secondary cell accumulators (alkaline, lead, sealed lead) at low temperatures. Based on these diagrams, the parameters characterizing the charge processes in the equipment tested are determined. It is concluded that all technologies, except the alkaline, are close to useless in temperatures below -20°C.

51-5606

Humidity transducers used for polar clothing. [Transductor capacitivo para la medida de la humedad aplicado al estudio del comportamiento de trajes polares]

Ramos, M., Solla, A.L., Actas del V Simposio Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 5th. Proceedings). Edited by J. Cacho and D. Serrat, Madrid, Comisión Interministerial de Ciencia y Tecnología, [1994], p.477-484, In Spanish with English summary. 4 refs.

Clothing, Humidity, Heat transfer, Sensors, Measuring instruments, Data processing

Experimental studies of transpirational properties of polar clothing are reported. The design and calibration of an instrument for measuring the relative humidity trapped in the garments are described in detail.

51-5607

Effects of evapotranspiration on the insulation properties of polar clothing. [Influencia del vapor de transpiración en las características aislantes de un abrigo polar]

Ramos Sainz, M., Actas del V Simposio Español de Estudios Antárticos. (Spanish Symposium on Antarctic Studies, 5th. Proceedings). Edited by J. Cacho and D. Serrat, Madrid, Comisión Interministerial de Ciencia y Tecnología, [1994], p.485-500, In Spanish with English summary. 7 refs.

Clothing, Thermal conductivity, Thermal insulation, Evapotranspiration, Sensors, Ventilation, Humidity, Low temperature research

The thermodynamic parameters (temperature distribution, thermal conductivity, transpiration) have been measured in a polar garment by two different operating modes: the activated and non-activated Interlayer Ventilation System (IVS). The experiments show that the IVS improves human comfort in polar condition.

51-5608

Trees and snow: the deposition of snow on the ground—a review and quantitative synthesis.

Bunnell, F.L., McNay, R.S., Shank, C.C., Integrated Wildlife Intensive Forestry Research Program report, IWIFR-17, Victoria, British Columbia, Province Ministry of Forests and Ministry of Environment, 1985, 440p. + append., Refs. passim. Some pages are incorrectly collated in the source.

Forest ecosystems, Animals, Forest canopy, Vegetation factors, Protective vegetation, Snow hedges, Interception, Snowfall, Snow cover distribution, Snow depth, Snow density, Canada—British Columbia

51-5609

Effects of reservoir regulation on ice jam thickness.

Zufelt, J.E., MP 4090, Congress of the International Association for Hydraulic Research (IAHR), 27th, San Francisco, CA, Aug. 10-15, 1997. Water for a changing global community. Energy and water: sustainable development, New York, American Society of Civil Engineers (ASCE), 1997, p.156-161, 1 ref.

Reservoirs, River flow, Flow control, River ice, Ice water interface, Ice jams, Ice cover thickness, Ice forecasting, Ice control, Mathematical models

Hydropower operations alter the natural levels of discharge in a river. In a seasonal sense, the effect of hydropower regulation is to average the flow, cutting off the very high and very low periods of discharge that may result in flooding or drought conditions. Peaking operations, however, may reverse this trend, resulting in flows that are much higher or lower than the natural flow levels for that time of the year. During winter, natural discharge levels are typically low and regulation for hydroelectric generation may result in brief periods of abnormally high and possibly low discharge under ice-covered conditions. Large variations in discharge over the hydropower cycling period may result in ice movement or grounding. Therefore, the range of discharge fluctuation is often limited during ice formation and breakup periods when the ice cover is most likely to move. This paper looks at the effects of these unsteady discharge fluctuations on the resulting ice cover thickness through the use of a numerical model. Two reservoir configurations are presented, which help examine the effects of hydropower regulation on the ice cover thickness in the reaches upstream and downstream from a hydropower facility.

51-5610

Ice effects on riprap: small-scale tests.

Sodhi, D.S., Borland, S., Stanley, J.M., Donnelly, C.J., MP 4091, Congress of the International Association for Hydraulic Research (IAHR), 27th, San Francisco, CA, Aug. 10-15, 1997. Water for a changing global community. Energy and water: sustainable development, New York, American Society of Civil Engineers (ASCE), 1997, p.162-167, 2 refs.

Bank protection (waterways), Rock fills, Ice push, Ice erosion, Ice friction, Ice loads, Ice control, Environmental tests

The authors conducted model tests to simulate interaction between floating ice sheets and sloping banks protected with riprap stones. Two series of tests were conducted, representing ice action against model riprap bank protection when the ice sheet moves perpendicular and at an angle of 45° to the shoreline. The first series of tests simulates ice shoving action, while the second series of tests incorporated both shoving and shearing actions of ice in equal proportion. They conducted 35 tests during the first series and 53 tests during the second series. The results indicate that the size of maximum stone (D_{100}) should be about 2.5 times the ice thickness to avoid damage from ice action either perpendicular or at an angle of 45° to the shoreline. The data on the probability of riprap failure indicate that the likelihood of riprap damage increases with the slope of a riprap protected bank.

51-5611

Ice jam mitigation for small streams.

Lever, J.H., MP 4092, Congress of the International Association for Hydraulic Research (IAHR), 27th, San Francisco, CA, Aug. 10-15, 1997. Water for a changing global community. Energy and water: sustainable development, New York, American Society of Civil Engineers (ASCE), 1997, p.168-173, 16 refs.

Streams, River ice, Ice jams, Ice booms, Ice cutting, Ice breaking, Ice control, Flood control, Cost analysis

Small streams can cause severe ice-jam flooding. Ice booms can mitigate freezeup ice jams for low cost and environmental impact provided suitable low-velocity pools are available. Low-cost breakup ice-control structures also exist, although work remains to quantify their effectiveness. Ice weakening could provide effective breakup ice-jam mitigation at very low cost and environmental impact. However, large natural variability in ice hydraulic conditions, lack of suitable theory and incomplete field data make it difficult to quantify their effectiveness.

51-5612

Simulation of dynamic river ice transport and jamming.

Lu, S.N., Shen, H.T., Crissman, R.D., Congress of the International Association for Hydraulic Research (IAHR), 27th, San Francisco, CA, Aug. 10-15, 1997. Water for a changing global community. Energy and water: sustainable development, New York, American Society of Civil Engineers (ASCE), 1997, p.174-179, 10 refs.

River ice, Ice jams, Ice water interface, Ice cover effect, Ice cover thickness, Drift, Ice forecasting, River flow, Flood forecasting, Computerized simulation, Niagara River

51-5613

Ice retention with artificial islands on the St. Marys River.

Tuthill, A.M., Carey, K.L., MP 4093, Congress of the International Association for Hydraulic Research (IAHR), 27th, San Francisco, CA, Aug. 10-15, 1997. Water for a changing global community. Energy and water: sustainable development, New York, American Society of Civil Engineers (ASCE), 1997, p.180-185, 4 refs.

River ice, Ice navigation, Ice booms, Ice control, Rock fills, Artificial islands, United States—Michigan—St. Marys River

For the past two decades, a navigation ice boom has alleviated ice problems at the head of the Little Rapids Cut, a channel constriction on the St. Marys River near Sault Ste. Marie, MI. This study assesses the feasibility of replacing portions of the ice boom with artificial islands constructed of quarried stone.

51-5614

Ice control at locks and dams.

Haynes, F.D., MP 4094, Congress of the International Association for Hydraulic Research (IAHR), 27th, San Francisco, CA, Aug. 10-15, 1997. Water for a changing global community. Energy and water: sustainable development, New York, American Society of Civil Engineers (ASCE), 1997, p.186-191, 4 refs.

Locks (waterways), Dams, Sluices (hydraulic engineering), Ice accretion, Ice loads, Ice prevention, Ice control, Bubbling, Heating, Artificial melting

Locks and dams have problems with ice every winter, especially those in the north. The most severe problem is ice accumulation in the miter gate recess. The second most severe problem around locks is ice in the upper approach. Another severe icing problem is water leaking past J-seals and subsequently freezing on cold surfaces, such as trunnion arms and adjacent concrete walls. In this paper, solutions to some of the most severe problems are presented, such as bubblers or some type of heater.

51-5615

Ice problems on hydropower project Włocławek (lower Vistula).

Majewski, W., Congress of the International Association for Hydraulic Research (IAHR), 27th, San Francisco, CA, Aug. 10-15, 1997. Water for a changing global community. Energy and water: sustainable development, New York, American Society of Civil Engineers (ASCE), 1997, p.192-197, 3 refs.

Reservoirs, Earth dams, River ice, Ice conditions, Ice jams, Ice control, Flood control, Poland

51-5616

Model scale measurements of ice loads on a Submerged Turret Loading (STL) tanker.

Løset, S., Kanestrøm, Ø., Congress of the International Association for Hydraulic Research (IAHR), 27th, San Francisco, CA, Aug. 10-15, 1997. Water for a changing global community. Energy and water: sustainable development, New York, American Society of Civil Engineers (ASCE), 1997, p.198-203, 10 refs.

Tanker ships, Offshore structures, Ice solid interface, Ice cover strength, Ice loads, Ice pressure, Ice friction, Ice breaking, Ice control, Environmental tests

51-5617

Laboratory study of suspended-sediment transport in ice-cover flow.

Braileanu, F., Ettema, R., Muste, M., Congress of the International Association for Hydraulic Research (IAHR), 27th, San Francisco, CA, Aug. 10-15, 1997. Water for a changing global community. Environmental and coastal hydraulics: protecting the aquatic habitat. Vol.2, New York, American Society of Civil Engineers (ASCE), 1997, p.1239-1244, 2 refs.

River ice, Ice water interface, Ice cover effect, River flow, Suspended sediments, Bottom sediment, Sediment transport, Alluvium, Environmental tests

51-5618

Effect of climate change on Danube flow regime.

Gauzer, B., Starosolszky, Ö., Congress of the International Association for Hydraulic Research (IAHR), 27th, San Francisco, CA, Aug. 10-15, 1997. Water for a changing global community. Managing water: coping with scarcity and abundance, New York, American Society of Civil Engineers (ASCE), 1997, p.572-577, 3 refs.

Snowmelt, Runoff forecasting, River flow, Flood forecasting, Computerized simulation

51-5619

Regional model of glaciers runoff and its application for hydrological forecasts.

Konovalov, V.G., Congress of the International Association for Hydraulic Research (IAHR), 27th, San Francisco, CA, Aug. 10-15, 1997. Water for a changing global community. Managing water: coping with scarcity and abundance, New York, American Society of Civil Engineers (ASCE), 1997, p.633-638.

Glacial hydrology, Meltwater, Runoff forecasting, Computerized simulation

51-5620

Analyses of flow and diffusion in arctic seas.

Wada, A., Hozumi, T., Takano, T., Congress of the International Association for Hydraulic Research (IAHR), 27th, San Francisco, CA, Aug. 10-15, 1997. Water for a changing global community. Managing water: coping with scarcity and abundance, New York, American Society of Civil Engineers (ASCE), 1997, p.671-676, 3 refs.

Radioactive wastes, Waste disposal, Water pollution, Ocean currents, Water transport, Water temperature, Salinity, Computerized simulation, Barents Sea, Russia—Kara Sea

51-5621

Estimation of flow resistance in ice covered channels.

Dong, Z.N., Mao, Z.Y., Wang, Y.T., Mu, G.F., Wang, J., Congress of the International Association for Hydraulic Research (IAHR), 27th, San Francisco, CA, Aug. 10-15, 1997. Water for a changing global community. Managing water: coping with scarcity and abundance, New York, American Society of Civil Engineers (ASCE), 1997, p.752-757, 4 refs.

River ice, Ice bottom surface, Ice water interface, Ice cover effect, River flow, Flood forecasting, Flow control

51-5622

Turbulent structure of open and ice-covered flow in a channel.

Kuznetsov, D.S., Debol'skaia, E.I., Congress of the International Association for Hydraulic Research (IAHR), 27th, San Francisco, CA, Aug. 10-15, 1997. Water for a changing global community. Managing water: coping with scarcity and abundance, New York, American Society of Civil Engineers (ASCE), 1997, p.758-762, 2 refs.

River ice, Ice bottom surface, Ice water interface, Ice cover effect, River flow, Turbulent flow, Mathematical models

51-5623

Particle-image velocimetry for ice-field velocities.

Ettema, R., Fujita, I., Muste, M., Kruger, A., Congress of the International Association for Hydraulic Research (IAHR), 27th, San Francisco, CA, Aug. 10-15, 1997. Water for a changing global community. Environmental and coastal hydraulics: protecting the aquatic habitat. Vol.1, New York, American Society of Civil Engineers (ASCE), 1997, p.137-142.

River ice, Drift, Ice forecasting, River flow, Flow measurement, Velocity measurement, Environmental tests, Environment simulation, Photographic techniques, Image processing

51-5624

Ground truthing the Cd/Ca-carbon isotope relationship in foraminifera of the Greenland-Iceland-Norwegian Seas.

McIntyre, K., Ravelo, A.C., Delaney, M.L., Anderson, L.D., Johannessen, T., *Marine geology,* July 1997, 140(1-2), p.61-73, 26 refs.

Marine biology, Pleistocene, Biomass, Plankton, Sedimentation, Water chemistry, Drill core analysis, Nutrient cycle, Isotope analysis, Carbon isotopes, Correlation, Greenland Sea, Norwegian Sea, Iceland Sea

51-5625

Approximate calculation of thaw depth in permafrost beneath a building of complex configuration.

Khrustalev, L.N., Emel'ianova, L.V., *Soil mechanics and foundation engineering,* May 1997, 33(6), p.213-216, Translated from Osnovaniia, fundamenty i mekhanika gruntov. 3 refs.

Permafrost beneath structures, Permafrost bases, Thaw depth, Frozen ground thermodynamics, Mathematical models, Stefan problem, Thermal regime

51-5626

Climate influences on growth and reproduction of *Pinus banksiana* (Pinaceae) at the limit of the species distribution in eastern North America.

Despland, E., Houle, G., *American journal of botany,* July 1997, 84(7), p.928-937, Refs. p.935-937.

Trees (plants), Plant ecology, Forest lines, Subarctic landscapes, Climatic factors, Cold stress, Growth, Distribution, Vegetation patterns

51-5627

Altnaharra minimum temperature of -27.2°C on 30 December 1995.

Burt, S., *Weather,* May 1997, 52(5), p.134-144, 8 refs.

Climatology, Weather observations, Synoptic meteorology, Air temperature, Temperature measurement, Atmospheric circulation, Records (extremes), Snow accumulation, Snow depth, United Kingdom—Altnaharra

51-5628

Boundary layer mass, water, and heat budgets in wintertime cold-air outbreaks from the arctic sea ice.

Brümmer, B., *Monthly weather review,* Aug. 1997, 125(8), p.1824-1837, 32 refs.

Climatology, Aerial surveys, Marine atmospheres, Atmospheric boundary layer, Air ice water interaction, Ice edge, Ice cover effect, Advection, Mass transfer, Heat flux, Mathematical models, Arctic Ocean

51-5629

Peracarid crustaceans (Malacostraca) from a "time-series station" in the Westwind Trough of the NEW-Polynya (Greenland): a benthic response to productivity?

Brandt, A., *Crustaceana,* Dec. 1996, 69(8), p.985-1004, Refs. p.1002-1004.

Marine biology, Oceanographic surveys, Polynyas, Ocean bottom, Sedimentation, Sampling, Classifications, Biomass, Ecosystems, Plankton, Water chemistry, Nutrient cycle, Greenland—Northeast Water Polynya

51-5630
Warming up to hot new evidence.
Moore, C.A., *International wildlife*, Jan.-Feb. 1997, 27(1), p.20-25.
Climatology, Ecology, Global warming, Sea level, Glacier melting, Environmental impact
This paper reports what scientists have discovered about our warming planet, compared to theoretical predictions, including the likelihood of antarctic ice sheet melting. (Auth. mod.)

51-5631
Changes in the atmospheric CH_4 gradient between Greenland and Antarctica during the Holocene.
Chappellaz, J., et al, *Journal of geophysical research*, July 20, 1997, 102(D13), p.15,987-15,997, Refs. p.995-997.
Climatology, Pleistocene, Wetlands, Atmospheric composition, Natural gas, Ice sheets, Ice air interface, Turbulent diffusion, Ice cores, Chemical analysis, Models, Greenland—Summit, Antarctica—Adélie Coast, Antarctica—Byrd Station
This study employs two antarctic ice cores, D47 and Byrd, whose gas-trapping conditions are comparable to a Greenland reference from GRIP. Also presented are new CH_4 measurements from the antarctic ice cores that cover the Holocene period, and are compared to the results with a refined GRIP CH_4 profile. The high resolution of these records reveals 4 different time periods when the CH_4 interpolar difference significantly changed. A three-box model is used to interpret this analytical signal in terms of changes in the CH_4 source strengths in the tropical regions and middle to high latitudes of the Northern Hemisphere during the Holocene. (Auth. mod.)

51-5632
Measurement technique for the determination of photolyzable chlorine and bromine in the atmosphere.
Impey, G.A., Shepson, P.B., Hastie, D.R., Barrie, L.A., *Journal of geophysical research*, July 20, 1997, 102(D13), p.15,999-16,004, 19 refs.
Meteorological instruments, Chemical analysis, Polar atmospheres, Atmospheric composition, Aerosols, Detection, Photochemical reactions, Simulation, Experimentation

51-5633
Measurements of photolyzable chlorine and bromine during the Polar Sunrise Experiment 1995.
Impey, G.A., Shepson, P.B., Hastie, D.R., Barrie, L.A., Anlauf, K.G., *Journal of geophysical research*, July 20, 1997, 102(D13), p.16,005-16,010, 29 refs.
Climatology, Polar atmospheres, Atmospheric composition, Ozone, Atmospheric boundary layer, Aerosols, Degradation, Photochemical reactions, Detection, Sampling, Correlation, Diurnal variations

51-5634
Köhler equation for finite systems: a simple estimation of possible condensation mechanisms in aircraft contrails.
Konopka, P., Vogelsberger, W., *Journal of geophysical research*, July 20, 1997, 102(D13), p.16,057-16,064, 28 refs.
Cloud physics, Aerosols, Atmospheric composition, Condensation trails, Condensation, Cloud droplets, Ice formation, Heterogeneous nucleation, Mathematical models, Air pollution

51-5635
Analysis of HALOE observations in summer high latitudes using airmass trajectory and photochemical model calculations.
Luo, M., Park, J.H., Lee, K.M., Russell, J.M., III, Bruehl, C., *Journal of geophysical research*, July 20, 1997, 102(D13), p.16,145-16,156, 22 refs.
Climatology, Polar atmospheres, Stratosphere, Ozone, Photometry, Profiles, Advection, Photochemical reactions, Turbulent diffusion, Atmospheric circulation, Models

51-5636
$ClONO_2$ vertical profile and estimated mixing ratios of ClO and HOCl in winter arctic stratosphere from Michelson interferometer for passive atmospheric sounding limb emission spectra.
Von Clarmann, T., et al, *Journal of geophysical research*, July 20, 1997, 102(D13), p.16,157-16,168, Refs. p.16,166-16,168.
Climatology, Polar atmospheres, Atmospheric composition, Stratosphere, Ozone, Aerosols, Sounding, Profiles, Turbulent diffusion, Spectra, Mathematical models

51-5637
Progress on low altitude cloud icing research.
Jeck, R.K., *U.S. National Aeronautics and Space Administration. Conference publication*, 1981, NASA CP-2192, Annual Workshop on Meteorological and Environmental Inputs to Aviation Systems, 5th, University of Tennessee Space Institute, Tullahoma, TN, Mar. 31- Apr. 2, 1981. Proceedings, p.59-63, 7 refs.
DLC TL556.W67 1981
Aircraft icing, Ice forecasting, Supercooled clouds, Cloud droplets, Unfrozen water content, Weather forecasting

51-5638
NASA/Lewis Research Center icing research program.
Evanich, P.L., *U.S. National Aeronautics and Space Administration. Conference publication*, 1981, NASA CP-2192, Annual Workshop on Meteorological and Environmental Inputs to Aviation Systems, 5th, University of Tennessee Space Institute, Tullahoma, TN, Mar. 31- Apr. 2, 1981. Proceedings, p.64-75.
DLC TL556.W67 1981
Aircraft icing, Ice accretion, Ice detection, Ice forecasting, Computerized simulation, Wind tunnels, Research projects

51-5639
Summary report: Icing and Frost Committee.
Chambers, H.W., ed, *U.S. National Aeronautics and Space Administration. Conference publication*, 1981, NASA CP-2192, Annual Workshop on Meteorological and Environmental Inputs to Aviation Systems, 5th, University of Tennessee Space Institute, Tullahoma, TN, Mar. 31- Apr. 2, 1981. Proceedings, p.118-121.
DLC TL556.W67 1981
Aircraft icing, Ice accretion, Ice detection, Ice forecasting, Environment simulation, Research projects

51-5640
Overview of FAA's Aircraft Icing Program.
Czekalski, L., *U.S. National Aeronautics and Space Administration. Conference publication*, 1985, NASA CP-2388, Annual Workshop on Meteorological and Environmental Inputs to Aviation Systems, 7th, University of Tennessee Space Institute, Tullahoma, TN, Oct. 26-28, 1983. Proceedings, p.30-34.
DLC TL556.M46 1985
Aircraft icing, Ice accretion, Ice detection, Ice forecasting, Safety, Research projects

51-5641
Overview of NASA's programs.
Tobiason, A.R., *U.S. National Aeronautics and Space Administration. Conference publication*, 1985, NASA CP-2388, Annual Workshop on Meteorological and Environmental Inputs to Aviation Systems, 7th, University of Tennessee Space Institute, Tullahoma, TN, Oct. 26-28, 1983. Proceedings, p.34-39.
DLC TL556.M46 1985
Aircraft icing, Ice detection, Ice forecasting, Research projects

51-5642
New characterization of the icing environment below 10,000 feet AGL from 7,000 miles of measurements in supercooled clouds.
Jeck, R.K., *U.S. National Aeronautics and Space Administration. Conference publication*, 1985, NASA CP-2388, Annual Workshop on Meteorological and Environmental Inputs to Aviation Systems, 7th, University of Tennessee Space Institute, Tullahoma, TN, Oct. 26-28, 1983. Proceedings, p.51-55, 7 refs.
DLC TL556.M46 1985
Aircraft icing, Ice accretion, Ice forecasting, Supercooled clouds, Cloud droplets, Safety

51-5643
New characterization of supercooled clouds below 10,000 feet AGL.
Masters, C.O., *U.S. National Aeronautics and Space Administration. Conference publication*, 1985, NASA CP-2388, Annual Workshop on Meteorological and Environmental Inputs to Aviation Systems, 7th, University of Tennessee Space Institute, Tullahoma, TN, Oct. 26-28, 1983. Proceedings, p.56-59, 3 refs.
DLC TL556.M46 1985
Aircraft icing, Ice accretion, Ice forecasting, Supercooled clouds, Cloud droplets

51-5644
Air temperature and precipitation data, Gulkana Glacier, Alaska, 1968-96.
Kennedy, B.W., Mayo, L.R., Trabant, D.C., March, R.S., *U.S. Geological Survey. Open-file report*, 1997, No.97-358, 144p., 21 refs.
Glacier surveys, Glacier oscillation, Glacier mass balance, Glacial meteorology, Air temperature, Precipitation (meteorology), Meteorological data, United States—Alaska—Gulkana Glacier

51-5645
Logistics recommendations for an improved U.S. arctic research capability.
Schlosser, P., ed, Tucker, W.B., ed, Flanders, N.E., ed, Warnick, W.K., ed, U.S. Arctic Research Commission, MP 4095, Fairbanks, AK, Arctic Research Consortium of the United States (ARCUS), 1997, 88p., 35 refs.
Research projects, Logistics, Stations, Expeditions, Regional planning

51-5646
Arctic pollution issues: a state of the arctic environment report.
AMAP (Arctic Monitoring and Assessment Programme), Oslo, Norway, 1997, 188p.
Polar atmospheres, Marine atmospheres, Air pollution, Water pollution, Ecosystems, Nutrient cycle, Health, Environmental impact, Environmental protection, International cooperation, Regional planning

51-5647
Site information and initial results from deep ice drilling on Law Dome, Antarctica.
Morgan, V.O., Wookey, C.W., Li, J., Van Ommen, T.D., Skinner, W., Fitzpatrick, M.F., *Journal of glaciology*, 1997, 43(143), p.3-10, 39 refs.
Paleoclimatology, Ice sheets, Ice cores, Drill core analysis, Ice crystal size, Oxygen isotopes, Isotope analysis, Ice dating, Volcanic ash, Antarctica—Law Dome
The aim of deep ice drilling on Law Dome has been to exploit the special characteristics of Law Dome summit, i.e. low temperature and high accumulation near an ice divide, to obtain a high-resolution ice core for climatic/environmental studies of the Holocene and the Last Glacial Maximum (LGM). Drilling was completed in Feb. 1993. The LGM/Holocene $\delta^{18}O$ shift of 7.0 per mill, only ca. 1 per mill larger than for Vostok, indicates that Law Dome remained an independent ice cap and was not overridden by the inland ice sheet in the Glacial. (Auth. mod.)

51-5648
Experiments on the damage process in ice under compressive states of stress.
Stone, B.M., Jordaan, I.J., Xiao, J., Jones, S.J., *Journal of glaciology*, 1997, 43(143), p.11-25, 33 refs.
Ice mechanics, Ice solid interface, Ice microstructure, Ice deformation, Ice creep, Mechanical tests, Shear stress, Damage, Cracking (fracturing), Compressive properties, Recrystallization, Thin sections

51-5649
Thermal conductivity of seasonal snow.
Sturm, M., Holmgren, J., König, M., Morris, K., MP 4096, *Journal of glaciology*, 1997, 43(143), p.26-41, 65 refs.
Snow physics, Snow thermal properties, Thermal conductivity, Snow density, Microstructure, Temperature effects, Temperature measurement, Analysis (mathematics), Standards, Statistical analysis, Accuracy
Twenty-seven studies on the thermal conductivity of snow have been published since 1886. Combined, they comprise 354 values and have been used to derive over 13 regression equations predicting thermal conductivity vs. density. Due to large (and largely undocumented) differences in measurement methods and accuracy, sample temperature and snow type, it is not possible to know what part of the

variability in this data set is the result of snow microstructure. The authors present a new data set containing 488 measurements for which the temperature, type and measurement accuracy are known. A quadratic equation can be fit to the new data. Within the data set, snow types resulting from kinetic growth show density-independent behavior. Rounded-grain and wind-blown snow show strong density dependence. The new data set has a higher mean value of density but a lower mean value of thermal conductivity than the old set. This shift is attributed to differences in snow types and sample temperatures in the sets. Both data sets show that there are well-defined limits to the geometric configurations that natural seasonal snow can take.

51-5650

Vapor transport, grain growth and depth-hoar development in the subarctic snow.

Sturm, M., Benson, C.S., MP 4097, *Journal of glaciology,* 1997, 43(143), p.42-59, 45 refs.

Snow physics, Metamorphism (snow), Snow cover structure, Grain size, Snow crystal growth, Depth hoar, Water vapor, Vapor transfer, Snow air interface, Isotope analysis, Mathematical models

Measurements from the subarctic snowpack are used to explore the relationship between grain growth and vapor flow, the fundamental processes of dry-snow metamorphism. Due to extreme temperature gradients, the subarctic pack undergoes extensive depth-hoar metamorphism. By the end of the winter a five-layered structure with a pronounced weak layer near the base of the snow evolves. Grain-size increases by a factor of 2-3, while the number of grains per unit mass decreases by a factor of 10. Calculated layer-to-layer vapor fluxes are ten times higher than inter-particle fluxes, which implies that depth-hoar grain growth is limited by factors other than the vapor supply. This finding suggests that gain and loss of water molecules due to sublimation from grains takes place at a rate many times higher than the rate at which grains grow, and it explains why grains can metamorphose into different forms so readily.

51-5651

Model of wind pumping for layered snow.

Colbeck, S.C., MP 4098, *Journal of glaciology,* 1997, 43(143), p.60-65, 16 refs.

Snow physics, Snow air interface, Snow permeability, Snow cover structure, Layers, Depth hoar, Air flow, Ventilation, Atmospheric pressure, Wind factors, Mathematical models

Layering affects the air flow through snow caused by surface pressure variations. The horizontal and total fluxes are high in hoar layers but the pressure perturbations and vertical components of the flow do not penetrate as deeply as in homogeneous snow. That is because the layers "pipe" the flow horizontally toward the area of low pressure. An ice layer at the surface reduces the total flow everywhere. The flow decreases as ice-layer thickness increases and, in general, flow changes with permeability. However, the magnitude of the effect is proportionately weaker when the ice layers are further from the surface. The residence time is reduced when hoar layers are present due to shorter flow paths, reduced penetration into the deeper snow and higher speeds.

51-5652

Response of the longwave radiation over melting snow and ice to atmospheric warming.

Meesters, A., Van den Broeke, M., *Journal of glaciology,* 1997, 43(143), p.66-70, 14 refs.

Ice sheets, Glacier surfaces, Radiance, Glacier melting, Ice air interface, Solar radiation, Radiation absorption, Analysis (mathematics), Global warming, Temperature effects

51-5653

Basal-flow characteristics of a linear medium sliding frictionless over small bedrock undulations.

Gudmundsson, G.H., *Journal of glaciology,* 1997, 43(143), p.71-79, 26 refs.

Glacial geology, Ice mechanics, Ice deformation, Basal sliding, Glacier flow, Velocity, Ice solid interface, Bedrock, Topographic effects, Surface roughness, Mathematical models

51-5654

Basal-flow characteristics of a non-linear flow sliding frictionless over strongly undulating bedrock.

Gudmundsson, G.H., *Journal of glaciology,* 1997, 43(143), p.80-89, 28 refs.

Glacial geology, Ice mechanics, Glacier flow, Viscous flow, Oscillations, Basal sliding, Velocity, Slope orientation, Ice solid interface, Bedrock, Topographic effects, Mathematical models

51-5655

Some comments on climatic reconstructions from ice cores drilled in areas of high melt.

Koerner, R.M., *Journal of glaciology,* 1997, 43(143), p.90-97, 50 refs.

Paleoclimatology, Climatic changes, Ice sheets, Ice cores, Drill core analysis, Impurities, Isotope analysis, Snowmelt, Models, Accuracy, Correlation

51-5656

Recession of the southern part of Barnes Ice Cap, Baffin Island, Canada, between 1961 and 1993, determined from digital mapping of Landsat TM.

Jacobs, J.D., Simms, E.L., Simms, A., *Journal of glaciology,* 1997, 43(143), p.98-102, 28 refs.

Glacier surveys, Spaceborne photography, LANDSAT, Photogrammetric surveys, Glacier oscillation, Glacier ablation, Sensor mapping, Topographic maps, Correlation, Seasonal variations, Canada—Northwest Territories—Baffin Island

51-5657

Inversion of borehole-response test data for estimation of subglacial hydraulic properties.

Stone, D.B., Clarke, G.K.C., Ellis, R.G., *Journal of glaciology,* 1997, 43(143), p.103-113, 26 refs.

Glacial hydrology, Subglacial drainage, Boreholes, Water flow, Hydraulics, Physical properties, Mathematical models, Statistical analysis

51-5658

Glaciological and oceanographic evidence of high melt rates beneath Pine Island Glacier, West Antarctica.

Jenkins, A., Vaughan, D.G., Jacobs, S.S., Hellmer, H.H., Keys, J.R., *Journal of glaciology,* 1997, 43(143), p.114-121, 22 refs.

Glacial hydrology, Glacier melting, Ice shelves, Glacier mass balance, Calving, Spaceborne photography, Heat loss, Ice water interface, Water temperature, Air ice water interaction, Antarctica—Pine Island Glacier

Satellite imagery indicates that the floating terminus of Pine Island Glacier has changed little in extent over the past two decades. Data on the velocity and thickness of the glacier reveal that calving accounts for only half of the ice input near the grounding line. The apparently steady configuration implies that the remainder of the input is lost by basal melting. Ocean circulation in Pine Island Bay transport +1°C waters beneath the glacier and temperatures recorded in melt-laden outflows show that heat loss from the ocean is consistent with the requirements of the calculated melt rate. The combination of iceberg calving and basal melting lies at the lower end of estimates for the total accumulation over the catchment basin, drawing into question previous estimates of a significantly positive mass budget for this part of the ice sheet. (Auth. mod.)

51-5659

On the surface energy budget of sea ice.

Wendler, G., Adolphs, U., Hauser, A., Moore, B., *Journal of glaciology,* 1997, 43(143), p.122-130, 27 refs.

Sea ice distribution, Albedo, Oceanographic surveys, Heat flux, Turbulent exchange, Surface energy, Air ice water interaction, Cloud cover

The surface energy budget was investigated during a cruise through the pack ice in the southern ocean. The time of observation was close to mid-summer. Some of the more important findings were: the mean albedo varied from 11% for open water to 59% for 10/10 ice cover, hourly values span the range from 6% (open water) to 76% (total ice cover); the net heat flux into the ocean was on average 109 W/m^2, if this energy were used solely for melting of sea ice, 30 mm could be melted each day; and for low surface albedos, the net radiation increased with decreasing cloudiness, however, the opposite was the case for a high surface albedo. The last point shows the importance of clouds on the surface energy budget. Not only should their presence or absence be known but also the reflectivity of the underlying surface, as it might change the net radiation in opposite ways. (Auth. mod.)

51-5660

Meteorological controls on glacier mass balance: empirical relations suggested by measurements on glacier de Sarennes, France.

Vincent, C., Vallon, M., *Journal of glaciology,* 1997, 43(143), p.131-137, 13 refs.

Glacial meteorology, Glacier surveys, Glacial hydrology, Glacier mass balance, Surface properties, Climatic changes, Degree days, Glacier oscillation, Seasonal variations, Statistical analysis, Albedo, France—Glacier de Sarennes

51-5661

Seasonal variations in the properties and structural composition of sea ice and snow cover in the Bellingshausen and Amundsen seas, Antarctica.

Jeffries, M.O., Worby, A.P., Morris, K., Weeks, W.F., *Journal of glaciology,* 1997, 43(143), p.138-151, 39 refs.

Sea ice distribution, Ice formation, Frazil ice, Ice cores, Stratigraphy, Isotope analysis, Profiles, Snow accumulation, Snow ice interface, Snow cover effect, Ice water interface, Seasonal variations, Antarctica—Bellingshausen Sea, Antarctica—Amundsen Sea

Sixty-three ice cores were collected in the Bellingshausen and Amundsen seas in Aug. and Sep. 1993 during a cruise of the R.V. *Nathaniel B. Palmer.* The structure and stable-isotopic composition of the cores were investigated in order to understand the growth conditions and to identify the key growth processes, particularly the contribution of snow to sea-ice formation. The structure and isotopic composition of a set of 12 cores that was collected for the same purpose in the Bellingshausen Sea in Mar. 1992 are reassessed. Frazil ice and congelation ice contribute 44% and 26%, respectively, to the composition of both the winter and summer ice-core sets. The accumulation of superimposed ice is evidence that melting in the snow cover on antarctic sea-ice floes can reach an advanced stage and contribute a significant amount of snow to the total ice mass. (Auth. mod.)

51-5662

Simulation of the historical variations in length of Unterer Grindelwaldgletscher, Switzerland.

Schmeits, M.J., Oerlemans, J., *Journal of glaciology,* 1997, 43(143), p.152-164, 25 refs.

Mountain glaciers, Glacier oscillation, Glacier flow, Glacier mass balance, Ice edge, Climatic factors, Air temperature, Mathematical models, Periodic variations, Simulation, Switzerland—Unterer Grindelwaldgletscher

51-5663

Avalanche frequency and terrain characteristics at Rogers' Pass, British Columbia, Canada.

Smith, M.J., McClung, D.M., *Journal of glaciology,* 1997, 43(143), p.165-171, 12 refs.

Avalanche forecasting, Avalanche tracks, Surface roughness, Slope orientation, Wind factors, Precipitation (meteorology), Snow water equivalent, Snow cover effect, Statistical analysis, Safety, Correlation, Canada—British Columbia—Rogers' Pass

51-5664

Rheology of till beneath Storglaciären, Sweden.

Hooke, R.L., Hanson, B., Iverson, N.R., Jansson, P., Fischer, U.H., *Journal of glaciology,* 1997, 43(143), p.172-179, 38 refs.

Glacial geology, Water pressure, Glacier flow, Sliding, Velocity measurement, Glacial deposits, Mechanical properties, Subglacial observations, Deformation, Shear strain, Ice solid interface, Rheology, Sweden—Storglaciären

51-5665

Modelling temperature variations in polar snow using DAISY.

Morris, E.M., Bader, H.P., Weilenmann, P., *Journal of glaciology,* 1997, 43(143), p.180-191, 31 refs.

Snow cover structure, Snow temperature, Snow density, Surface temperature, Snow air interface, Radiation balance, Climatic changes, Temperature measurement, Mathematical models, Simulation

A physics-based snow model has been calibrated using data collected at Halley Bay during the International Geophysical Year. Variations in snow temperature and density are well-simulated using values for the model parameters within the range reported from other polar field experiments. The effect of uncertainty in the parameter values on the accuracy of the predictions is no greater than the effect of instrumental error in the input data. Thus, this model can be used with parameters determined a priori rather than by optimization. The model has been validated using an independent data set from Halley Bay and then used to estimate 10 m temperatures on the Antarctic Peninsula plateau over the last half-century. (Auth.)

51-5666

Comments on "Annual net balance of North Cascade glaciers, 1984-94" by Mauri S. Pelto.

Meier, M.F., Armstrong, R., Diurgerov, M.B., Pelto, M.S., *Journal of glaciology,* 1997, 43(143), p.192-196, Includes reply. 28 refs. For pertinent paper see 50-4886.

Glacier mass balance, Mountain glaciers, Glacier oscillation, Glacier surveys, Statistical analysis, Correlation, Measurement, Accuracy, Standards, United States—Washington—North Cascades

51-5667

Thermohaline circulation and interaction between ice shelf cavities and the adjacent open ocean.

Grosfeld, K., Gerdes, R., Determann, J., *Journal of geophysical research,* July 15, 1997, 102(C7), p.15,595-15,610, 35 refs.

Oceanography, Ocean currents, Ice shelves, Ice melting, Hydrography, Ice water interface, Bottom topography, Topography, Ice cover effect, Hydrodynamics, Mathematical models

Applying a three-dimensional ocean general circulation model to an idealized ice shelf cavity geometry coupled with an open ocean at a topographic ice shelf barrier, the authors found an important parameter controlling the interaction between these two systems. Idealized studies for different ice shelf and sea bottom topographies and forcing mechanisms for the open ocean show that the ice shelf edge represents a natural barrier for barotropic interaction, because of the sudden decrease in water column thickness. An increased barotropic current can surmount the ice edge and ventilate the water mass beneath the ice shelf only at lateral sloping sidewalls or at deep depressions, which can be found, for example, in the southern Weddell Sea. In all other cases the circulation in the ice shelf cavity is closed and almost unaffected by the hydrography outside the barrier. (Auth. mod.)

51-5668

Tides in the Arctic Ocean from a finite element model.

Lyard, F.H., *Journal of geophysical research,* July 15, 1997, 102(C7), p.15,611-15,638, 39 refs.

Oceanography, Ocean currents, Tidal currents, Water waves, Spectra, Hydrodynamics, Bottom topography, Topographic effects, Ice cover effect, Mathematical models, Arctic Ocean

51-5669

Expected uncertainty in satellite-derived estimates of the surface radiation budget at high latitudes.

Key, J.R., Schweiger, A.J., Stone, R.S., *Journal of geophysical research,* July 15, 1997, 102(C7), p.15,837-15,847, 51 refs.

Climatology, Polar atmospheres, Radiation balance, Radiance, Surface temperature, Remote sensing, Cloud cover, Optical properties, Albedo, Ice cover effect, Snow cover effect, Statistical analysis, Accuracy

51-5670

Elastic-viscous-plastic model for sea ice dynamics.

Hunke, E.C., Dukowicz, J.K., *Journal of physical oceanography,* Sep. 1997, 27(9), p.1849-1867, 50 refs.

Oceanography, Sea ice, Air ice water interaction, Pack ice, Ice mechanics, Elastic waves, Viscoelasticity, Rheology, Thermodynamics, Computerized simulation, Ice models

51-5671

Air-ice-ocean momentum exchanges. Part II: ice drift.

Perrie, W., Hu, Y.C., *Journal of physical oceanography,* Sep. 1997, 27(9), p.1976-1996, 32 refs.

Oceanography, Sea ice, Air ice water interaction, Ice floes, Drift, Velocity, Ice edge, Water waves, Spectra, Attenuation, Friction, Wind velocity, Mathematical models

51-5672

Evaluation of EPIC's snowmelt and water erosion submodels using data from the Peace River region of Alberta.

Puurveen, H., Izaurralde, R.C, Chanasyk, D.S., Williams, J.R., Grant, R.F., *Canadian journal of soil science,* Feb. 1997, 77(1), p.41-50, With French summary. 19 refs.

Soil erosion, Water erosion, Snow hydrology, Snowmelt, Runoff, Agriculture, Vegetation factors, Seasonal variations, Computerized simulation, Mathematical models, Accuracy, Canada—Alberta—Peace River

51-5673

Creep of water ices at planetary conditions: a compilation.

Durham, W.B., Kirby, S.H., Stern, L.A., *Journal of geophysical research,* July 25, 1997, 102(E7), p.16,293-16,302, 38 refs.

Ice creep, Ice mechanics, Ice deformation, Ice strength, Strains, Extraterrestrial ice, Satellites (natural), Phase transformations, Classifications, Simulation, High pressure tests, Ice solid interface, Rheology

51-5674

Chemical schemes for surface modification of icy satellites: a road map.

Delitsky, M.L., Lane, A.L., *Journal of geophysical research,* July 25, 1997, 102(E7), p.16,385-16,390, 38 refs.

Extraterrestrial ice, Ice physics, Satellites (natural), Regolith, Geochemistry, Carbon dioxide, Ionization, Radiation absorption, Simulation

51-5675

Secondary dispersal of tree seeds on snow.

Greene, D.F., Johnson, E.A., *Journal of ecology,* June 1997, 85(7), p.329-340, 20 refs.

Plant ecology, Trees (plants), Snow air interface, Sediment transport, Dispersions, Wind velocity, Distribution, Vegetation patterns, Wind tunnels, Simulation

51-5676

Effect of vegetation on an ice-age climate model simulation.

Crowley, T.J., Baum, S.K., *Journal of geophysical research,* July 27, 1997, 102(D14), p.16,463-16,480, Refs. p.16,477-16,480.

Paleoclimatology, Pleistocene, Paleoecology, Vegetation patterns, Climatic factors, Global change, Vegetation factors, Air temperature, Precipitation (meteorology), Simulation, Models

51-5677

Application of cloud microphysics to NCAR community climate model.

Ghan, S.J., Leung, L.R., *Journal of geophysical research,* July 27, 1997, 102(D14), p.16,507-16,527, Refs. p.16,525-16,527.

Climatology, Clouds (meteorology), Radiation balance, Cloud physics, Optical properties, Ice sublimation, Ice water interface, Snow crystals, Condensation, Ice crystals, Particle size distribution, Temperature effects, Mathematical models

51-5678

Numerical simulation of cloud plumes emanating from arctic leads.

Burk, S.D., Fett, R.W., Englebretson, R.E., *Journal of geophysical research,* July 27, 1997, 102(D14), p.16,529-16,544, 35 refs.

Climatology, Synoptic meteorology, Fronts (meteorology), Atmospheric boundary layer, Marine atmospheres, Polar atmospheres, Cloud physics, Ice openings, Advection, Moisture transfer, Air ice water interaction, Mathematical models, Cloud dissipation

51-5679

Annually resolved Southern Hemisphere volcanic history from two antarctic ice cores.

Cole-Dai, J., Mosley-Thompson, E., Thompson, L.G., *Journal of geophysical research,* July 27, 1997, 102(D14), p.16,761-16,771, 44 refs.

Ice sheets, Ice cores, Ice dating, Aerosols, Volcanic ash, Sedimentation, Geochronology, Origin, Antarctica—Dyer Plateau, Antarctica—Siple Station

The continuous sulfate analysis of two antarctic ice cores, one from the Antarctic Peninsula region and one from West Antarctica, provides an annually resolved proxy history of Southern Hemisphere volcanism since early in the 15th century. The dating is accurate within ±3 years due to the high rate of snow accumulation at both core sites and the small sample sizes used for analysis. The two sulfate records are consistent with each other. A systematic and objective method of separating outstanding sulfate events from the background sulfate flux is proposed and used to identify all volcanic signals. A technique for comparing the magnitude of volcanic events preserved within different ice cores is developed using normalized sulfate flux. (Auth. mod.)

51-5680

Lightning activity of a hailstorm as a function of changes in its microphysical characteristics inferred from polarimetric radar observations.

López, R.E., Aubagnac, J.P., *Journal of geophysical research,* July 27, 1997, 102(D14), p.16,799-16,813, 24 refs.

Precipitation (meteorology), Classifications, Hail, Snow pellets, Thunderstorms, Supercooled clouds, Atmospheric electricity, Ice detection, Lightning, Radar echoes, Reflectivity

51-5681

Aspects of the environmental safety in the processes of the development of oil/gas fields offshore Sakhalin.

Gnezdova, T.V., Kravchenko, A.N., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.1, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.38-41, 9 refs.

Petroleum industry, Economic development, Exploration, Offshore drilling, Environmental impact, Environmental protection, Russia—Sakhalin Island

51-5682

Role of oil and gas projects of Sakhalin shelf in supplement of Far-Eastern region of Russia with fuel-energy resource.

Brodskiĭ, L.S., Vasianovich, I.F., Terpugov, E.K., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.1, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.42-45.

Economic development, Petroleum industry, Exploration, Coal, Crude oil, Natural gas, Fuels, Russia—Sakhalin Island

51-5683

Oil and gas exploration on the north Sakhalin and its shelf.

Zakal'skiĭ, V.M., Koval'chuk, V.S., Kuchin, A.V., Mavrinskiĭ, IU.S., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.1, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.46-49, 1 ref.

Geological surveys, Exploration, Crude oil, Natural gas, Natural resources, Offshore drilling, Petroleum industry, Economic development, Russia—Sakhalin Island

51-5684

Petroleum possibilities of the Far Eastern seas.

Koblov, E.G., Mavrinskiĭ, IU.S., Kharakhinov, V.V., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.1, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.50-61, 1 ref.

Geological surveys, Exploration, Crude oil, Natural gas, Natural resources, Offshore drilling, Petroleum industry, Economic development, Russia—Sakhalin Island

51-5685

Production and domestic distribution of Sakhalin offshore natural gas.

Bogdanchikov, S.M., Astaf'ev, V.N., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.1, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.62-67.

Petroleum industry, Economic development, Offshore drilling, Natural gas, Gas production, Fuels, Russia—Sakhalin Island

51-5686

Parameters of ice ridges of the Okhotsk Sea.

Surkov, G.A., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.1, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.68-69.

Ice surveys, Pressure ridges, Hummocks, Russia—Sakhalin Island, Okhotsk Sea

51-5687

Gas hydrates in the Messoyakha gas field of the West Siberian Basin—a re-examination of the geologic evidence.

Collett, T.S., Ginsburg, G.D., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.1, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.96-103, 25 refs.

Geological surveys, Exploration, Natural resources, Hydrates, Natural gas, Gas production, Well logging, Russia—Gydan Peninsula

51-5688

Project of marine dressing complex for mining the deposits of the Far Eastern and North-Eastern seas shelf.

Zhukov, A.V., Lutsenko, V.T., Zvonarev, M.I., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.1, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.138-142, 6 refs.

Exploration, Natural resources, Minerals, Ocean bottom, Bottom sediment, Mining, Economic development, Ocean environments, Environmental protection, Russia

51-5689

Efficient system for floating production, storage and loading in ice-covered sea.

Bech, A., Bech, C.M., Syvertsen, K., Vinje, T., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.1, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.322-329, 3 refs.

Offshore structures, Oil storage, Tanker ships, Moorings, Ice solid interface, Ice loads, Ice friction, Ice control

51-5690

Disconnectable concrete FPSO for arctic conditions.

Des Déserts, L., Parsloe, N., Thiébaud, F., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.1, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.342-348, 3 refs.

Oil storage, Floating structures, Concrete structures, Tanker ships, Moorings, Icebergs, Ice control

51-5691

Study of the multi-function removable concrete platform.

Song, Y.P., Wei, Y., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.1, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.412-415, 9 refs.

Offshore drilling, Oil storage, Offshore structures, Floating structures, Concrete structures, Temperature distribution, Thermal stresses, Structural analysis, Design criteria, Mathematical models, China—Bohai Sea

51-5692

Specialized information system on environment of Yamal Peninsula and Baydaratskaya Bay.

Odishariia, G.E., Tsvetsinskiĭ, A.S., Mikhaĭlov, N.N., Dubikov, G.I., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.1, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.574-581, 23 refs.

Exploration, Gas production, Gas pipelines, Route surveys, Site surveys, Environmental impact, Environmental protection, Data processing, Computer programs, Russia—Baydaratskaya Bay

51-5693

Environmental impact assessment for the Baydaratskaya Bay crossing of the Yamal-West Europe gas pipeline system.

Beloshapkov, A.V., Leshchinskiĭ, V.B., Tsvetsinskiĭ, A.S., Kashunin, K.A., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.1, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.582-586, 9 refs.

Gas pipelines, Pipe laying, Site surveys, Route surveys, Environmental impact, Environmental protection, Legislation, Russia—Baydaratskaya Bay

51-5694

Proceedings. Vol.2.

International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997, Chung, J.S., ed, Frederking, R.M.W., ed, Saeki, H., ed, Bekker, A.T., ed, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, 705p., Refs. passim. For selected papers see 51-5695 through 51-5749.

Offshore structures, Ice solid interface, Ice loads, Ice pressure, Ice friction, Ice cover strength, Ice deformation, Ice breaking, Ice conditions, Ice forecasting

51-5695

Instrumentation and research program on Confederation Bridge.

Cheung, M.S., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.10-16, 7 refs.

Bridges, Piers, Ice solid interface, Ice loads, Ice pressure, Ice friction, Strain measuring instruments, Monitors, Canada—Northumberland Strait

51-5696

Transport support for oil and gas production facilities on the Sakhalin offshore.

Polomoshnov, A.M., Astaf'ev, S.V., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.208-211, 5 refs.

Petroleum transportation, Pipelines, Offshore structures, Moorings, Tanker ships, Icebreakers, Sea ice distribution, Ice cover thickness, Ice conditions, Ice navigation, Russia—Sakhalin Island

51-5697

Numerical simulation to determine ice scour and pipeline burial depths.

Yoon, K.Y., Choi, K.S., Park, H.I., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.212-219, 12 refs.

Ice scoring, Ice erosion, Ice loads, Ice friction, Ice forecasting, Ocean bottom, Bottom topography, Underground pipelines, Pipe laying, Trenching, Mathematical models, Russia—Sakhalin Island

51-5698

Sour resistant X65 UOE line pipe for low-temperature service.

Terada, Y., Tamehiro, H., Ishikawa, H., Sugiyama, M., Chijiiwa, R., Ayukawa, N., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.220-225, 8 refs.

Pipelines, Pipes (tubes), Steels, Low temperature tests, Corrosion

51-5699

Technological regimes of the natural gas transport by marine pipelines with Schtokmanovskoe gas condensate field, Barentsevo Sea.

Figarov, N.G., Rusakova, V.V., Tsurikov, A.S., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.226-232, 5 refs.

Gas pipelines, Underground pipelines, Ocean bottom, Route surveys, Pipe laying, Pipeline freezing, Frost penetration, Frost heave, Frost forecasting, Frost protection, Mathematical models, Barents Sea, Russia—Kola Peninsula

51-5700

Prevention of hydrate formation in pipelines by electrical methods.

Lervik, J.K., Kulbotten, H., Klevjer, G., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.249-254, 7 refs.

Ocean bottom, Sea water, Water temperature, Pipelines, Pipeline heating, Electric heating, Hydrates, Pipe flow, Flow control

51-5701

JOIA project of study on ice load.

Saeki, H., et al, International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.349-355, 12 refs. For another version see 51-1325.

Offshore structures, Ice solid interface, Ice loads, Ice pressure, Ice friction, Ice cover strength, Ice deformation, Ice forecasting, Environmental tests, Research projects

51-5702

Distinct element simulation of ice sheet failure against offshore structures.

Katsuragi, K., Ochi, M., Seto, H., Kawasaki, T., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.356-359, 2 refs.

Offshore structures, Artificial islands, Ice solid interface, Ice pileup, Ice loads, Ice pressure, Ice friction, Ice cover strength, Ice deformation, Ice breaking, Computerized simulation

51-5703

Simulation of ice loads on a conical shaped structure: comparison with experimental results.

Kato, K., Izumiyama, K., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.360-367, 10 refs.

Offshore structures, Ice solid interface, Ice loads, Ice pressure, Ice friction, Ice cover strength, Ice deformation, Ice breaking, Ice pileup, Environmental tests, Computerized simulation

51-5704

Medium scale field indentation tests—physical properties and strength of the ice sheet.

Matsushita, H., et al, International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.368-375, 1 ref.

Ice solid interface, Ice structure, Ice cover strength, Ice loads, Ice pressure, Ice deformation, Ice breaking, Impact tests, Penetration tests

51-5705

Medium-Scale Field Indentation Tests (MSFIT)—ice failure characteristics in ice/structure interactions.

Takeuchi, T., et al, International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.376-382, 4 refs.

Offshore structures, Ice solid interface, Ice cover strength, Ice loads, Ice pressure, Ice friction, Ice deformation, Ice breaking, Penetration tests

51-5706

Medium-Scale Field Indentation Tests: measurements of ice sheet deformation under ice-structure interactions by means of photogrammetry.

Sakai, M., Aoshima, M., Katsui, H., Suzuki, M., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.383-386, 2 refs.

Offshore structures, Ice solid interface, Ice loads, Ice pressure, Ice friction, Ice cover strength, Ice deformation, Ice breaking, Penetration tests, Photogrammetry

51-5707

Experimental studies on nonsimultaneous failure characteristics of vertical sided indentors.

Kamesaki, K., Tsukuda, H., Yamauchi, Y., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.387-393, 14 refs.

Offshore structures, Ice solid interface, Ice loads, Ice pressure, Ice friction, Ice cover strength, Ice deformation, Ice breaking, Impact tests, Penetration tests, Computerized simulation

51-5708

Thermal stressing of pack ice.

Lewis, J.K., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.394-401, 27 refs.

Pack ice, Ice floes, Ice heat flux, Ice thermal properties, Thermal stresses, Ice cover strength, Ice pressure, Ice friction, Ice loads, Ice deformation, Ice creep, Ice cracks, Computerized simulation

51-5709

Ductile deformation of columnar (S2) saline ice under triaxial compression.

Melton, J.S., Schulson, E.M., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.402-409, 16 refs.

Salt ice, Ice cover strength, Ice loads, Ice pressure, Ice plasticity, Ice deformation, Ice cracks

51-5710

Flexural strength of ice with non-uniform thickness.

Timco, G.W., Cornett, A.M., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.410-414, 10 refs.

Ice cover thickness, Ice cover strength, Flexural strength, Ice loads, Ice pressure, Ice deformation, Ice breaking, Statistical analysis

51-5711

Temperature effect on strength of ice under triaxial compression.

Fish, A.M., Zaretskiĭ, IU.K., MP 5001, International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.415-422, 22 refs.

Ice strength, Ice thermal properties, Ice temperature, Ice pressure, Ice friction, Ice creep, Ice deformation, Icebergs, Regelation, Mathematical models

A temperature model has been developed that describes the ice strength in a multiaxial stress state over a wide spectrum of negative temperatures. The model takes into account the anomalous behavior of ice under high hydrostatic pressure, when its strength reaches a maximum, and then gradually decreases with the pressure increase. It has been shown that strength of ice under high hydrostatic pressure is described by an extended Drucker-Prager (parabolic) strength criterion with only 3 fundamental parameters, ice cohesion, internal friction angle, and ice melting pressure, which all have a definite physical meaning and are functions of temperature. The model has been verified using test data on the strength of iceberg ice and laboratory-made polycrystalline freshwater ice under triaxial compression at strain rates between 10^{-3} and 10^{-5}/s over the temperature range between -1°C and -40°C.

51-5712

Ice floe collisions: a neglected attribute of wave dissipation in ice fields.

Squire, V.A., Shen, H.H., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.423-427, 20 refs.

Ice floes, Ice edge, Frazil ice, Ice elasticity, Ice cover strength, Ice cover effect, Ice water interface, Ocean waves, Wave propagation, Attenuation, Mathematical models

51-5713

Discrete and lattice models of floating ice covers.

Sayed, M., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.428-433, 24 refs.

Offshore structures, Piers, Ice floes, Ice solid interface, Ice cover strength, Ice loads, Ice pressure, Ice friction, Ice deformation, Pressure ridges, Ice cracks, Ice models, Computerized simulation

51-5714

Assessment of the wave-iceberg load combination factor.

Foschi, R.O., Isaacson, M., Allyn, N., Saudy, I., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.434-441, 25 refs.

Offshore structures, Icebergs, Ice solid interface, Ice loads, Ice pressure, Ice friction, Ocean waves, Computerized simulation

51-5715

Ice boom loads in the St. Lawrence River, 1994-95 & 1995-96.

Cornett, A.M., Frederking, R.M.W., Morse, B., Dumont, S., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.442-448, 5 refs.

River ice, Ice control, Ice booms, Ice loads, Ice pressure, Ice forecasting, Statistical analysis, Canada—Saint Lawrence River

51-5716

Ridge ice loads on proposed faceted conical structure.

Wang, Z.G., Muggeridge, D.B., Croasdale, K.R., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.449-456, 15 refs.

Offshore structures, Ice solid interface, Ice loads, Ice pressure, Ice friction, Pressure ridges, Ice breaking, Ice cracks, Environmental tests, Design criteria

51-5717

Vertical ice forces on large-diameter marine structures under water level changes.

Terashima, T., Nakazawa, N., Nishihata, A., Honda, H., Kawai, T., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.457-460, 4 refs.

Offshore structures, Ice solid interface, Ice adhesion, Ice loads, Ice pressure, Water level, Mathematical models

51-5718

Method of ridge ice force analysis on offshore structures.

Bekker, A.T., Komarova, O.A., Vasil'ev, S.L., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.461-465, 11 refs.

Offshore structures, Ice solid interface, Pressure ridges, Ice loads, Ice pressure, Ice cover strength, Design criteria

51-5719

Experimental study of the friction of ice over concrete at the centimetre scale.

Fiorio, B., Meyssonnier, J., Boulon, M., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.466-472, 17 refs.

Offshore structures, Concrete structures, Concrete strength, Ice solid interface, Ice loads, Ice adhesion, Ice friction, Ice cover strength, Ice deformation, Strain tests, Environmental tests

51-5720

Abrasion of steel sheet piles due to ice flow movements.

Terashima, T., Hanada, M., Kawai, T., Oshima, K., Hara, F., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.473-479, 10 refs.

Channels (waterways), Hydraulic structures, Piles, Steel structures, Ice floes, Ice solid interface, Metal ice friction, Abrasion, Corrosion, Japan—Hokkaido, Okhotsk Sea

51-5721

Discrete element modelling of the local interaction between a stationary structure and a moving ice pack.

Sepehr, K., Selvadurai, A.P.S., Comfort, G., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.480-486, 19 refs.

Offshore structures, Ice floes, Ice solid interface, Ice cover strength, Ice loads, Ice pressure, Ice friction, Ice deformation, Ice cracks, Ice breaking, Mathematical models

51-5722

Design parameters for hummocks and grounded hummocks in the Sea of Okhotsk.

Beketskiĭ, S.P., Astaf'ev, V.N., Truskov, P.A., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.487-493, 5 refs.

Ice conditions, Pressure ridges, Hummocks, Grounded ice, Ice pileup, Ice cover strength, Ice pressure, Ice loads, Russia—Sakhalin Island

51-5723

Description of sea ice regime for offshore construction.

Bekker, A.T., Appel', I.L., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.494-497, 3 refs.

Petroleum industry, Offshore drilling, Exploration, Ice conditions, Ice models, Ice forecasting, Statistical analysis

51-5724

Methodology for developing a scientific basis for the Ice Regime System.

Timco, G.W., Frederking, R.M.W., Santos-Pedro, V.M., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.498-503, 10 refs.

Ice conditions, Ice navigation, Ice reporting, Ice forecasting, Ice routing, Northwest passage, Safety, Data processing, Data transmission, Canada

51-5725

Real-time monitoring of river ice floes.

Morse, B., Choquette, M., Savard, M., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.504-507, 10 refs.

River ice, Ice jams, Ice conditions, Ice surveys, Ice forecasting, Ice reporting, Ice control, Ice booms, Artificial islands, Flood control, Data processing, Data transmission, Canada—Saint Lawrence River

51-5726

Ice conditions in an anisotropic sea ice dynamics model.

Pritchard, R.S., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.508-513, 9 refs.

Ice conditions, Sea ice distribution, Ice cover thickness, Ice forecasting, Ice cover strength, Ice plasticity, Ice models, Computerized simulation

51-5727

Numerical modeling of ice state for ship operation.

Appel', I.L., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.514-520, 8 refs.

Ice conditions, Sea ice distribution, Ice cover thickness, Ice forecasting, Ice navigation, Ice routing, Ice models, Computerized simulation, Northern Sea Route

51-5728

On the damage of skeg and steering gear of the M/V "Stepan Krasheninnikov" in the antarctic ice.

Barabanov, N.V., Moskalenko, A., Lapin, E., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.521-522.

Ships, Ice navigation, Ice loads, Metal ice friction, Accidents, —South Atlantic Ocean

On Feb. 28, 1994, the MV *Stepan Krasheninnikov* was damaged by cracks in its rudder and skeg caused by ice while it was operating in the Lazarev Sea close to the coast of Antarctica. It managed to make it back to Durban, South Africa, under its own power, where it was repaired.

51-5729

Landing and parking curves for the C-17 Globemaster on sea ice: McMurdo Station, Antarctica.

Barthelemy, J.L., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.523-528, 5 refs.

Ice runways, Ice cover strength, Ice elasticity, Trafficability, Airplanes, Logistics, Antarctica—McMurdo Station

The United States Antarctic Program operates a seasonal sea-ice runway at McMurdo Station that supports heavy-haul wheeled aircraft during the short but vital resupply window. The Naval Facilities Engineering Service Center provides criteria to the National Science Foundation for the safe operation of these aircraft. During 1996, landing and parking curves were developed for the newest Air Force transport, the C-17 Globemaster, which had been scheduled tentatively for service in Antarctica in the month of Oct. 1996. Although this new transport weighs somewhat less than the C-5 Galaxy it is scheduled to replace, the C-17 also has just half as many wheels, and leaves correspondingly heavier footprints on the ice. In spite of somewhat greater localized stresses around the landing gear, the thickness of sea ice grown during the "typical" antarctic winter is sufficient to support the maximum aircraft weight of 2.6 MN on landing, takeoff and during turnaround parking. (Auth.)

51-5730

Development of a modern heavy-haul traverse for Antarctica.

Blaisdell, G.L., Richmond, P.W., Kaiser, F.C., Alger, R.G., MP 5002, International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.529-536, 5 refs.

Logistics, Traverses, Route surveys, Crevasse detection, Tracked vehicles, Sleds, Ice roads, Snow roads, Trafficability

An integrated, interdisciplinary study was completed to assess the feasibility of an oversnow route from McMurdo to the Amundsen-Scott Station. Currently the only means of supplying the Amundsen-Scott Station is by specialized aircraft. Air photo and satellite imagery were used extensively, along with ground-penetrating impulse radar (deployed from a helicopter) to make preliminary determinations of the suitability of glaciers in the Transantarctic Mountains for heavy tractor access from the Ross Ice Shelf to the polar plateau. These were followed by ground reconnaissance and data gathering. Modern traverse equipment was also developed and tested as part of this study. Tractor performance and terrain information were used to compare two potential traverse routes and to calculate delivered payload, fuel consumption, and travel time. (Auth.)

51-5731

Polar Ice Prediction System (PIPS 2.0)—the Navy's sea ice forecasting system.

Posey, P.G., Preller, R.H., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.537-543, 13 refs.

Ice surveys, Sea ice distribution, Ice conditions, Ice edge, Drift, Ice forecasting, Ice models, Spaceborne photography, Image processing, Data processing, Computerized simulation

51-5732

Characteristics of frequency spectra of wind waves in the presence of sea ice.

Hayakawa, T., Sasajima, T., Yoshino, M., Goto, C., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.544-550, 6 refs.

Ice water interface, Ice cover effect, Ocean waves, Sea states, Statistical analysis, Japan—Hokkaido, Okhotsk Sea

51-5733

Analysis of wave fields around a flexible sheet structure with Green function method.

Hamanaka, K., Kato, M., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.551-557, 2 refs.

Ocean waves, Water waves, Wave propagation, Hydraulic structures, Damping, Mathematical models

51-5734

Arctic shoreline oil combatting experiments in 1996 in Murmansk.

Rytkönen, J., Piskonen, R., Itävaara, M., Matishov, G.G., Petrov, V.S., Il'in, G.V., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.558-564, 14 refs.

Oil spills, Soil pollution, Water pollution, Oil recovery, Littoral zone, Soil microbiology, Soil chemistry, Waste disposal, Land reclamation, Russia—Murmansk

51-5735

Improvement of oil bioremediation on the shoreline.

Rytkönen, J., Itävaara, M., Paulsen, J.E., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.565-571, 17 refs.

Oil spills, Oil recovery, Soil pollution, Water pollution, Littoral zone, Soil microbiology, Soil chemistry, Waste disposal, Land reclamation, Russia—Murmansk

51-5736

Pollution abatement at McMurdo Station, Antarctica.

Chiang, E., Chang, S.C., Brown, A.J., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.572-578, 10 refs.

Stations, Oil spills, Soil pollution, Water pollution, Waste disposal, Environmental protection, Land reclamation, Antarctica—McMurdo Station

The soil and marine sediment of McMurdo Station, the logistical hub of the U.S. Antarctic Program, are contaminated by both petroleum hydrocarbons and the residual products of waste disposal. These contaminants were released to the environment during earlier years of expeditionary operations. Since 1987, the National Science Foundation has initiated a number of measures in pollution abatement to correct past abuses and to protect the antarctic environment. These measures include promulgation of waste regulations, development and implementation of a waste management program, cleanup of the station waste dump sites, and development of spill prevention and spill response plans. (Auth.)

51-5737

On the adhesion of oil to ice.

Liukkonen, S., Rytkönen, J., Al'khimenko, A.I., Kniazeva, E., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.579-586, 17 refs.

Oil spills, Water pollution, Ice cover effect, Ice water interface, Ice air interface, Liquid solid interfaces, Interfacial tension, Adhesion

51-5738

In-situ burning: an alternative approach to oil spill clean-up in arctic waters.

Guénette, C.C., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.587-593, 32 refs.

Oil spills, Water pollution, Ice water interface, Ice cover effect, Waste disposal, Countermeasures

51-5739

Modelling oil pollution under ice cover.

Al'khimenko, A.I., Bol'shev, A.S., IAkovlev, A., Klevanny, K.A., Liukkonen, S., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.594-601, 20 refs.

Oil spills, Oil recovery, Water pollution, Waste disposal, Ice water interface, Ice cover effect, Environmental tests, Computerized simulation

51-5740

Study of polluted air masses coming ways into Arctics.

Prokhorenkov, A.M., Sovlukov, A.S., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.602-607, 5 refs.

Air pollution, Polar atmospheres, Atmospheric circulation, Atmospheric composition, Air masses, Haze, Precipitation (meteorology), Scavenging, Global change

51-5741

Source locations of contaminated sea ice derived using backward trajectories from an ice-ocean model.

Preller, R.H., Posey, P.G., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.608-614, 12 refs.

Radioactive wastes, Waste disposal, Water pollution, Ice rafting, Drift, Impurities, Ice water interface, Ocean currents, Sediment transport, Computerized simulation

51-5742

Intelligent Sensor Protection System for polar and marine environments.

Stein, P.J., Bahlavouni, A., Andersen, D.W., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.615-620, 4 refs.

Radiation measuring instruments, Radomes, Ice accretion, Ice prevention, Defrosting, Radiometry, Telemetering equipment, Data transmission

51-5743

Application of the pivot point on FCP diagram to low-temperature fatigue of materials.

Duan, M.L., Li, J.C.M., Li, J., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.621-625, 15 refs.

Offshore structures, Steels, Low temperature tests, Cold stress, Fatigue (materials), Crack propagation, Mathematical models

51-5744

Laboratory simulation of wet icing build-up on H.V. insulators.

Farzaneh, M., Laforte, J.L., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.626-632, 12 refs.

Power line icing, Ice accretion, Glaze, Electrical insulation, Electric corona, Environmental tests

51-5745

Theoretical investigation of the distribution of freshwater spongy spray on a vertical cylinder.

Blackmore, R.Z., Lozowski, E.P., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.633-639, 24 refs.

Ship icing, Spray freezing, Ice accretion, Icing rate, Spongy ice, Ice loads, Ice forecasting, Mathematical models

51-5746

Atmospheric icing on cables of different flexibilities.

McComber, P., Druez, J., Laflamme, J., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.640-646, 14 refs.

Power line icing, Ice accretion, Ice loads, Ice forecasting, Wind pressure, Damping, Mathematical models

51-5747

Ice accretion and shedding on overhead line cables.

Druez, J., McComber, P., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.647-655, 20 refs.

Power line icing, Ice accretion, Icing rate, Ice loads, Ice forecasting, Ice removal

51-5748

Development of a Russian standard for submarine pipeline design, installation and operation.

Kamyshev, M.A., De Vries, J.G., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.677-685, 12 refs.

Underground pipelines, Ocean bottom, Route surveys, Pipe laying, Building codes, Standards, Design criteria, Russia

51-5749

Limit force ice loads and their significance to offshore structures in the Beaufort Sea.

Comfort, G., Singh, S., Dinovitzer, A., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.686-692, 21 refs.

Offshore structures, Ice solid interface, Ice loads, Ice pressure, Ice friction, Pressure ridges, Design criteria, Statistical analysis, Canada, Beaufort Sea

51-5750

Satellite measurements and their application to the Pechora Sea.

Hajji, H., Sproson, R.A., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.3, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.42-47, 12 refs.

Oceanographic surveys, Ocean waves, Sea states, Wind pressure, Ice surveys, Ice detection, Sea ice distribution, Radio echo soundings, Synthetic aperture radar, Spaceborne photography, Russia, Barents Sea

51-5751

Construction applications of fiber reinforced polymer composites: a survey.

Kant, T., Ramana, V.P.V., Dutta, P.K., Mukherjee, A., Desai, Y., MP 4099, International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.4, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.657-663, 107 refs.

Composite materials, Synthetic materials, Construction materials, Polymers, Plastics, Reinforced concretes

A review is made of the different applications of fiber reinforced polymer composite (FRPC) materials and carbon fiber reinforced plastic (CFRB) cables in construction. The potential FRPC application areas are classified into three groups, namely: repair and rehabilitation of structural elements using FRPC sheets; FRPC bars as a reinforcement material for concrete structural elements; and structural elements made of FRPC. Literature relevant to FRPC material in construction is divided into the above three groups. This review focuses on experimental research only. No attempt has been made to identify different analytical studies available on FRPC. Sub-topics of the above three areas are mentioned along with partial references.

51-5752

Micromechanical study of the freeze-thaw behavior of polymer composites.

Dutta, P.K., MP 5000, International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.4, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.672-676, 5 refs.

Polymers, Composite materials, Low temperature tests, Freeze thaw tests, Thermal stresses, Cold weather construction, Mathematical models

The essential quality of a good polymer composite is that the bond between the fiber and the matrix is well established and is continuous both around the fiber and along its length. When a load is applied in the direction of the fiber, the ratio of the load share depends on the relative elastic modulus of the fiber and the matrix. However, the elastic modulus of the polymer matrix is significantly influenced by the temperature. At low temperature the modulus of elasticity increases considerably, and thus load sharing changes between the fibers and the matrix. Also, because of the mismatch of coefficient of thermal expansion (CTE) of matrix and fiber, the matrix is usually stretched in the fiber direction during curing, and develops internal tensile stress, interfacial shear stress, hoop stress, and radial stress. On further cooling during the freezing process, the magnitude of all these induced stresses would usually increase, developing potential microcracks. The change in the radial or clamping stress which controls the crack development and propagation (fracture) both across and along the fiber would also change the composite's fracture behavior in the low temperature regime. More complex stresses are developed when the composites are constructed as laminates with each lamina (layers of fibers) having fiber orientations different from the adjacent ones. Reductions of strength and modulus of composites, following freeze-thaw cycling, as evident in experimental results, support this micromechanical theory of composites degradation.

51-5753
Ripping frozen ground with an attachment for dozers.
Sellmann, P.V., Hill, D.R., SR 97-14, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* June 1997, 15p., ADA-327 813, 11 refs.
Tracked vehicles, Tractors, Construction equipment, Military equipment, Frozen ground strength, Excavation, Trenching, Earthwork, Fortifications
Ripping of hard and frozen ground is commonly done by using crawler tractors with rear-mounted rippers that are usually a permanent part of the machine. Ripping is an attractive alternative to other methods of breaking a hard surface layer that restricts excavation, since it utilizes existing equipment and personnel, and a tractor that can be used for the excavation project. A simple ripper attachment for use on the blade of a dozer was used to determine if this easily installed tool could provide some ripping capability when machines with rear-mounted rippers are not available. This ripper attachment was used in a range of frozen soils that could not be excavated with a dozer, and was used on tractors ranging in size from small commercial dozers to a large military dozer with a suspension system. In all cases, at the sites used, the ripper attachment provided the machines with some ripping capability. The ripper was also easy to install, with no modifications required to the tractors or the rippers.

51-5754
Evaluation of airport subsurface materials.
Janoo, V.C., Eaton, R., Barna, L., SR 97-13, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* May 1997, 26p., ADA-327 880, 26 refs.
Runways, Pavements, Subgrade soils, Soil trafficability, Soil tests, Freeze thaw tests, Frost heave, Thaw weakening, Frost resistance, Frost protection, Drainage, Soil stabilization
Pavement structures located in regions with seasonal changes encounter regular cycles of freezing and thawing. Such environmental factors must be considered so that it can be certain that the pavement can accommodate continuous aircraft loading. Eleven subsurface materials specified by the Federal Aviation Administration (FAA) were examined to determine their susceptibility to frost heave and thaw-weakening. All but two of the materials were found to be frost-susceptible under the U.S. Army Corps of Engineers criterion that no more than 3% of fines be smaller than 0.02 mm (0.78 x 10^3/in.). The frost-susceptible materials were also evaluated using Asphalt Institute criteria, which also categorized them as frost-susceptible. The 11 materials were evaluated for susceptibility to thaw-weakening using a drainage model which focuses on the permeability of the drainage layer. The final recommendations (which are based only on a literature review) are that, to reduce frost-susceptibility and thaw-weakening, the amount passing the no.200 sieve should be kept lower than 2% and drainage layers should be installed below the pavement.

51-5755
Glaciological data collected by the 36th Japanese Antarctic Research Expedition during 1995-1996.
Azuma, N., et al, *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1997, No.223, 83p., Refs. passim.
Traverses, Snow accumulation, Meteorological data, Snow temperature, Snow density
This report presents an outline of field observations carried out by JARE-36 in 1995-1996. Data on snow accumulation, density and temperature, and surface meteorological data collected during oversnow traverses, are discussed and presented in tables.

51-5756
***Psychrobacter glacincola* sp. nov., a halotolerant, psychrophilic bacterium isolated from antarctic sea ice.**
Bowman, J.P., Nichols, D.S., McMeekin, T.A., *Systematic and applied microbiology,* June 1997, 20(2), p.209-215, Refs. p.214-215.
Microbiology, Bacteria, Marine biology, Sea ice, Antarctica—Vestfold Hills, Antarctica—Amery Ice Shelf
Two groups of halotolerant, strictly oxidative, non-motile bacterial strains with a distinct coccoidal morphology were isolated from predominantly congelation sea ice collected from the Vestfold Hills area and from anchor ice of the Amery Ice Shelf. One group of strains were found to be phenotypically similar to the species *Psychrobacter immobilis.* A second group of strains possessed an optimal temperature for growth of 13-15°C, and required seawater for optimal growth and failed to form acid from carbohydrates. These strains were also halotolerant growing in the presence of NaCl concentrations up to 1.8-2.1 M. Further characterization studies determined that the strains belonged to a single distinct taxon within the genus *Psychrobacter* which differed phenotypically and genotypically from other *Psychrobacter* species isolated from Antarctica and other environments. *Psychrobacter urativorans* ACAM 534^T was the closest phylogenetic relative to the novel sea ice taxa in terms of 16S rDNA sequence similarity of 96.7%. The sea ice strains thus represent a novel species within the genus *Psychrobacter* with the proposed name, *Psychrobacter glacincola* n. sp. (Auth. mod.)

51-5757
Mineralization and burial of organic carbon in sediments of the southern Weddell Sea (Antarctica).
Hulth, S., Tengberg, A., Landén, A., Hall, P.O.J., *Deep-sea research I,* June 1997, 44(6), p.955-981, 71 refs.
Sediments, Sea water, Chemical composition, Oxygen, Mass balance, Antarctica—Weddell Sea
Benthic fluxes of oxygen, alkalinity (A_T), total carbonate (C_T or ΣCO_2) and dissolved organic carbon (DOC) were measured during sediment-water incubations at 16 stations in the southern Weddell Sea with water depths between 280 and 2514 m. The total sediment oxygen consumption rates (TSOC) were in general low and more comparable to measurements in slope and deep-sea sediments at a few thousand meters water depth. Benthic mass balances of carbon revealed that benthic fluxes of DOC were 3-147% of the corrected fluxes of ΣCO_2, and the recycling efficiencies (E) were up to 35% higher if the DOC fluxes were included in the calculations of E, rather than the inorganic ΣCO_2 flux alone. The recycling efficiencies, including the benthic flux of DOC, ranged between 57 and 88% (mean 78%). Measured rates of inorganic C accumulation were a factor of 6-7 lower than organic C accumulation rates. (Auth. mod.)

51-5758
Mid-depth ventilation in the western boundary current system of the sub-polar gyre.
Pickart, R.S., Spall, M.A., Lazier, J.R.N., *Deep-sea research I,* June 1997, 44(6), p.1025-1054, 22 refs.
Sea water, Ocean currents, Oxygen, Ventilation, Labrador Sea

51-5759
Formation processes of ice body revealed by the internal structure of perennial snow patches in Japan.
Kawashima, K., *Bulletin of glacier research,* July 1997, No.15, p.1-10, 22 refs.
Snow line, Snow cover structure, Snow stratigraphy, Metamorphism (snow), Snow compression, Snow density, Snow water content, Snow ice interface, Firn stratification, Mountain glaciers, Glacier alimentation, Glacier formation, Japan

51-5760
Glacier variations of Hielo Patagónico Norte, Chile, between 1944/45 and 1995/96.
Aniya, M., Wakao, Y., *Bulletin of glacier research,* July 1997, No.15, p.11-18, 16 refs.
Mountain glaciers, Glacier surveys, Glacier oscillation, Glacier ablation, Glacial lakes, Glacial meteorology, Climatic changes, Chile—Patagonia

51-5761
Outline of Russo-Japanese joint glacier research in Kamchatka, 1996.
Kobayashi, D., Murav'ev, IA.D., Kodama, Y., Shiraiwa, T., *Bulletin of glacier research,* July 1997, No.15, p.19-26, 21 refs.
Mountain glaciers, Glacier surveys, Glacial geology, Glacier oscillation, Glacial meteorology, Climatic changes, Paleoclimatology, Research projects, Expeditions, International cooperation, Russia—Kamchatka Peninsula

51-5762
Glaciological features of Koryto Glacier in the Kronotsky Peninsula, Kamchatka, Russia.
Shiraiwa, T., Murav'ev, IA.D., Yamaguchi, S., Glazirin, G.E., Kodama, Y., Matsumoto, T., *Bulletin of glacier research,* July 1997, No.15, p.27-36, 15 refs.
Mountain glaciers, Glacier surveys, Glacier oscillation, Glacier mass balance, Glacial meteorology, Glacier alimentation, Glacier ablation, Ice cores, Climatic changes, Russia—Kamchatka Peninsula

51-5763
Hydrometeorological features of Koryto Glacier in the Kronotsky Peninsula, Kamchatka, Russia.
Kodama, Y., Matsumoto, T., Glazirin, G.E., Murav'ev, IA.D., Shiraiwa, T., Yamaguchi, S., *Bulletin of glacier research,* July 1997, No.15, p.37-45, 4 refs.
Mountain glaciers, Glacier surveys, Glacier oscillation, Glacier heat balance, Glacial hydrology, Glacial meteorology, Climatic factors, Russia—Kamchatka Peninsula

51-5764
Flow of Koryto Glacier in the Kronotsky Peninsula, Kamchatka, Russia.
Yamaguchi, S., Shiraiwa, T., Murav'ev, IA.D., Glazirin, G.E., Naruse, R., *Bulletin of glacier research,* July 1997, No.15, p.47-52, 10 refs.
Mountain glaciers, Glacier surveys, Glacier oscillation, Glacier flow, Glacial meteorology, Glacier formation, Climatic factors, Russia—Kamchatka Peninsula

51-5765
Basic studies for assessing the impacts of the global warming on the Himalayan cryosphere, 1994-1996.
Nakawo, M., Fujita, K., Ageta, Y., Shankar, K., Pokhrel, A.P., Yao, T.D., *Bulletin of glacier research,* July 1997, No.15, p.53-58, 25 refs.
Mountain glaciers, Glacier oscillation, Glacier heat balance, Glacial meteorology, Permafrost surveys, Permafrost distribution, Paleoclimatology, Global warming, Research projects, Expeditions, Nepal

51-5766
Hydrodynamic effects on the basin expansion of Tsho Rolpa Glacier Lake in the Nepal Himalaya.
Chikita, K., Yamada, T., Sakai, A., Ghimire, R.P., *Bulletin of glacier research,* July 1997, No.15, p.59-69, 16 refs.
Mountain glaciers, Glacial hydrology, Meltwater, Glacial lakes, Suspended sediments, Moraines, Hydrodynamics, Global warming, Lake bursts, Flood forecasting, Nepal

51-5767
Meteorological observation in Langtang Valley, Nepal Himalayas, 1996.
Fujita, K., Sakai, A., Chhetri, T.B., *Bulletin of glacier research,* July 1997, No.15, p.71-78, 23 refs.
Mountain glaciers, Glacial hydrology, Glacial meteorology, Weather stations, Weather observations, Meteorological data, Air temperature, Surface temperature, Humidity, Precipitation (meteorology), Nepal

51-5768
Water discharge from the Lirung Glacier in Langtang Valley, Nepal Himalayas, 1996.
Sakai, A., Fujita, K., Aoki, T., Asahi, K., Nakawo, M., *Bulletin of glacier research,* July 1997, No.15, p.79-83, 4 refs.
Mountain glaciers, Glacial hydrology, Meltwater, Glacial rivers, Runoff forecasting, Nepal

51-5769
Effect of surface dust on snow melt.
Adhikary, S., Seko, K., Nakawo, M., Ageta, Y., Miyazaki, N., *Bulletin of glacier research,* July 1997, No.15, p.85-92, 13 refs.
Dusting, Snow surface, Albedo, Snow air interface, Snow heat flux, Snow melting

51-5770
Quantitative evaluation of sublimation and the estimation of original hydrogen and oxygen isotope ratios of a firn core at east Queen Maud Land, Antarctica.
Satake, H., Kawada, K., *Bulletin of glacier research,* July 1997, No.15, p.93-97, 19 refs.
Atmospheric composition, Scavenging, Snow air interface, Snow composition, Snow evaporation, Depth hoar, Firn, Ice sublimation, Ice composition, Ice cores, Isotope analysis, Antarctica—Queen Maud Land
The quantitative evaluation of sublimation during firnification and the estimation of original hydrogen and oxygen isotope ratios of deposited snow were attempted by a simultaneous measurement of δD and $\delta^{18}O$ values in a firn core having well-developed depth hoar collected at east Queen Maud Land. The d-parameter of the core ranged from 11 to 18 and showed good positive correlation with the depth hoar level suggesting that the increase in the d-parameter from 10 was caused by post-depositional firnification in which sublimation plays an important role. Based on the d-parameters, the firn was estimated to have lost 30-35% of deposited snow during firnification and to be enriched in deuterium and oxygen-18 by about 50 and 6 per mill, respectively, relative to the deposited snow. (Auth.)

51-5771

Preliminary study on the shape of snow penitents at Piloto Glacier, the central Andes.

Naruse, R., Leiva, J.C., *Bulletin of glacier research,* July 1997, No.15, p.99-104, 9 refs.

Mountain glaciers, Glacier mass balance, Glacier surfaces, Glacier ablation, Snow surface, Snow air interface, Snow evaporation, Snow melting, Insolation, Argentina—Andes

51-5772

Expedition ARCTIC '96 of RV *Polarstern* (ARK XII) with the Arctic Climate System Study (ACSYS). [Die Expedition ARCTIC '96 des FS *Polarstern* (ARK XII) mit der Arctic Climate System Study (ACSYS)]

Augstein, E., *Berichte zur Polarforschung,* 1997, No.234, 54p., With German summary.

Research projects, Expeditions, Climate, Hydrography, Ocean currents, Sea ice, Arctic Ocean

51-5773

Development of three-dimensional flow code package to predict performance and stability of aircraft with leading edge ice contamination: final report, option 2.

Strash, D.J., Summa, J.M., *U.S. National Aeronautics and Space Administration. Contractor report,* Sep. 1996, NASA-CR-198519, 100p., N19970001772, 18 refs.

Aircraft icing, Fluid dynamics, Cold weather performance, Ice formation, Boundary layer, Ice cover effect, Wind tunnels, Computer programs, Forecasting

51-5774

Update to the NASA Lewis Ice Accretion Code LEWICE: final report.

Wright, W.B., *U.S. National Aeronautics and Space Administration. Contractor report,* Oct. 1994, NASA-CR-195387, 48p., N95-14295, 29 refs.

Aircraft icing, Ice accretion, Computer programs, Manuals, Mathematical models, Thermodynamics

51-5775

Role of wind tunnels and computer codes in the certification and qualification of rotorcraft for flight in forecast icing.

Fleming, R.J., Britton, R.K., Bond, T.H., *U.S. National Aeronautics and Space Administration. Technical Memorandum,* Oct. 1994, NASA-TM-106747, 23p., N95-13197, 20 refs. Presented at the 20th European Rotorcraft Forum, Amsterdam, the Netherlands, Oct. 4-7, 1994.

Aircraft icing, Computer programs, Safety, Helicopters, Cold weather performance, Wind tunnels, Moisture

51-5776

Collaborative research on aircraft icing and charging processes in ice: final annual technical report.

Saunders, C.P., *European Office of Aerospace Research and Development. Technical report,* Sep. 1994, EOARD-TR-94-07, 44p., ADA-285 102, Ref. p.24-41.

Aircraft icing, Ice formation, Ice fog, Cloud physics, Charge transfer, Electric fields, Lightning, Thunderstorms, Ice crystals

51-5777

Experimental technique and assessment for measuring the convective heat transfer coefficient from natural ice accretions.

Masiulaniec, K.C., Vanfossen, G.J., Dewitt, K.J., Dukhan, N., *U.S. National Aeronautics and Space Administration. Technical memorandum,* Mar. 1995, NASA-TM-106864, 26p., N95-23248, 28 refs. Prepared for the 33rd Aerospace Sciences Meeting and Exhibit sponsored by the American Institute of Aeronautics and Astronautics, Reno, NV, Jan. 9-12, 1995.

Aircraft icing, Heat transfer coefficient, Ice formation, Wind tunnels, Heat flux

51-5778

Snow properties and measurement: for use in mobility algorithms.

Richmond, P.W., MP 5003, *U.S. Army Corps of Engineers. Waterways Experiment Station. Miscellaneous paper,* Jan. 1997, GL-97-3, North American Workshop on Modeling the Mechanics of Off-Road Mobility, 2nd, Vicksburg, MS, Mar. 13-15, 1996. Proceedings. Edited by D.A. Horner, G.L. Mason, N. Deliman and R.A. Jones, p.C8-C13, 9 refs.

Snow cover effect, Snow strength, Snow depth, Snow density, Trafficability

☆U.S. GOVERNMENT PRINTING OFFICE: 1998-600-107-80501